



November 2018

Environmental Assessment

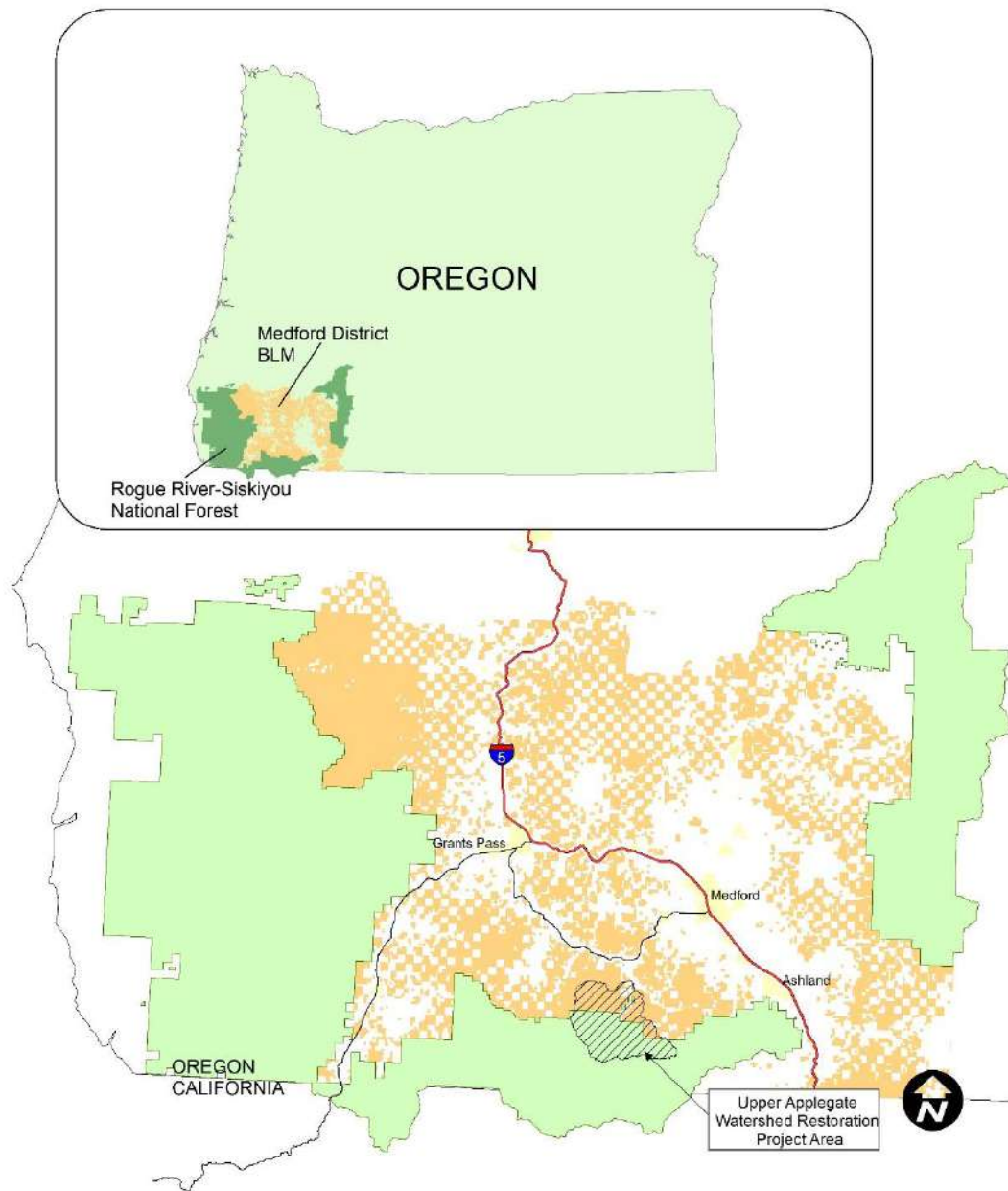
Upper Applegate Watershed Restoration Project

**Siskiyou Mountains Ranger District
Rogue River-Siskiyou National Forest**

**Ashland Resource Area
Medford District, Bureau of Land Management**



Upper Applegate Watershed Restoration Project Vicinity



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Environmental Assessment**

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Environmental Assessment

Upper Applegate Watershed Restoration Project

Working to Restore Nature's Benefits

CHAPTER 1. PURPOSE AND NEED FOR ACTION

In 2008, the U.S. Forest Service and Department of Interior (DOI) updated their existing National Environmental Policy Act (NEPA) procedures (36 CFR 220; 43 CFR 46) to permit a more open, transparent and collaborative approach to carrying out the NEPA mandate. This was dubbed “iterative NEPA” or iNEPA. This approach reflects the incremental stages in which proposed actions are refined or improved throughout the NEPA process with stakeholders. The iNEPA approach was adopted for this project because of the collaborative approach utilized to design the Proposed Action based on community and agency identified values. This environmental assessment (EA) discloses the environmental effects that would result from the proposed action.

The Proposed Action addresses the need to sustain ecological processes and provide a diversity of benefits. The public engagement process emphasized information exchange to increase understanding about connections between human benefits and ecosystems, while encouraging dialogue among stakeholders, the Forest Service (FS) and the Bureau of Land Management (BLM).

I. Background

The planning process for the 52,000 acre Upper Applegate watershed is a collaborative effort between stakeholders and federal agencies that incorporates an all-lands approach to address landscape resilience to disturbance and climate change. An objective of this effort is to identify desired values (based on a “nature’s benefits” or ecosystem services approach) from which activities can be designed to restore or enhance these benefits and related ecological processes.

Using this approach, the agencies hope to highlight the goods and services provided by forests to communities. Collaboratively developed projects that recognize the connection between ecological conditions and a sustainable flow of goods and services form the foundation of this proposed action.

Additionally, this collaborative work within the Upper Applegate utilizes adaptive management principles. Adaptive management is a process that bases management actions on clearly defined outcomes and monitoring to determine if actions are meeting desired goals, and if not, to facilitate changes in management that will best ensure those outcomes are met.

Multiple community workshops were held to provide the opportunity for early public engagement to integrate community values in the development of project proposals in the Upper Applegate watershed. A consistent theme heard at these community workshops was that the agencies need to refer to goals identified in the Applegate Adaptive Management Area (AMA) Guide.

“RESTORATION MEANS CREATING AND MAINTAINING HEALTHY, RESILIENT FORESTS CAPABLE OF DELIVERING ALL THE BENEFITS THAT PEOPLE GET FROM THEM—CLEAN AIR AND WATER, CARBON SEQUESTRATION, HABITAT FOR NATIVE FISH AND WILDLIFE, FOREST PRODUCTS, OPPORTUNITIES FOR OUTDOOR RECREATION, AND MORE.”

USDA FOREST SERVICE RESTORATION WEBSITE

The AMA Guide is a collaboratively developed document completed in 1998 following designation of the Applegate AMA by the Northwest Forest Plan (1994) and is a product that reflects thoughtful and forward-thinking concepts.

Specific goals developed for the Applegate Adaptive Management Area include:

1. Achieve healthy, diverse, and functioning ecosystems that are sustainable over time. *The "ecosystem" refers to the interacting natural system including people and all other living organisms as well as the nonliving environment. In order to foster healthy social and economic systems, we want to:*

- * Understand the relationships between sustainable resources and sustainable economies (supporting sustainable communities).*
- * Develop clear criteria and indicators of sustainability reflecting shared values and monitor measurable criteria over time.*
- * Enhance the relationship of agencies to the communities adjacent to the Adaptive Management Area. We want to create a climate of trust and cooperation between agencies and private citizens.*
- * Contribute to the economic well-being of communities where possible. (The agencies are not responsible for the communities' overall health but recognize their influence on social and economic functions.)*

2. Create adaptive organizations. *Participating agencies¹ responsible for management of the Applegate Adaptive Management Area want to help create a learning environment which is accessible and responsive. The Bureau of Land Management and Forest Service want to:*

- * Improve the capacity for local public problem-solving across boundaries.*
- * Gain understanding, cooperation, and mutual respect among the federal agencies, and between agencies and citizens.*
- * Use resources efficiently.*
- * Apply ecological principles.*
- * Use adaptive management principles of testing, monitoring, and learning, and share this learning with all partners.*
- * Share knowledge freely and effectively.*

Titled the *Applegate Communities Collaborative Fire Protection Strategy*, the "Applegate Fire Plan" began as an idea between the Applegate Partnership, the Forest Service, and the BLM. As with the AMA Guide, it was developed as an all-lands strategy and not a specific plan for any single piece of land. The fire plan was one of the first Community Wildfire Protection Plans developed in the nation and has been used as a model for others to develop community-based plans.

The goals of the Applegate Fire Plan included:

1. To improve community awareness of our stewardship of the land and foster a respect for ecosystems and the processes that maintain them.
2. To develop a wide array of strategies for fuel reduction and fire suppression that Applegate residents can accept as sensible precautions against catastrophic fire and that the agencies that manage lands in the Applegate can incorporate into their current management practices.
3. To develop a system of emergency communications for Applegate neighborhoods.
4. To restore fire-adaptive species in the ecosystems, thereby encouraging more fire-resilient forests.

¹ Participating agencies include those responsible for management of federal lands in the Applegate watershed. Though the BLM's 2016 Resource Management Plan does not recognize the Adaptive Management Area designation created by the Northwest Forest Plan, the goals identified in the AMA Guide are still relevant to the BLM.

Another document, the *Applegate Valley Strategic Plan*, was developed with community input and was finalized in July 1997. The visions and goals identified in the Applegate Valley Strategic Plan demonstrate public concerns and awareness of the interconnections of the social, economic and natural systems.

Nearly 20 years later, the vision outlined in the Strategic Plan and the goals of the AMA Guide have not been fully realized. This Upper Applegate watershed planning process is designed to move toward these vision and goals by engaging the community early and often in the NEPA process.

“OUR FORESTS ARE HEALTHY, NATURAL SYSTEMS MANAGED FOR A VARIETY OF RESOURCES INCLUDING WILDLIFE, BIRDS, AND WOOD PRODUCTS. WE PROTECT OUR OLD GROWTH FORESTS AND WE HAVE INTRODUCED FIRE INTO THE FOREST ECOSYSTEM. WE HAVE CREATED CATHEDRAL FORESTS NEAR HOMES TO REDUCE THE RISK OF DESTRUCTIVE FIRE. OUR RIVERS ARE HEALTHY PRODUCTIVE PLACES THAT ARE FREE FROM DEVELOPMENT AND CONTAIN ABUNDANT FISH.”

APPLEGATE VALLEY STRATEGIC PLAN 1997

II. Benefits from Nature

“Benefits from nature” are the goods and services that people receive from natural systems. This concept aligns well with goals in the aforementioned plans and strategies – i.e., to manage the land adaptively to achieve social and ecological sustainability. The “benefits from nature” concept was integrated into this planning process to underscore relationships between ecological, social and economic conditions in and around the AMA.

In addition to building relationships with the local communities and stakeholders, the goal of the community workshops was to identify important values provided by the landscape, highlight how management activities support these benefits, and design a collaborative proposal that sustains these values over time. Three questions were asked of the community:

- What are the benefits from the land within the Upper Applegate watershed?
- What threatens or limits the ability of the land to provide those benefits over time?
- What management actions may be needed to mitigate those risks?

III. Community and Agency Identified Values

Initially, nearly fifty “values” were identified in the community workshops. Further discussions in subsequent workshops grouped and prioritized important values.

The following values, organized into three major themes, were identified as high priorities for the Upper Applegate watershed.

- **Water and Aquatic Habitat**
 - Water quality and quantity.
- **Terrestrial Biodiversity**
 - Late-successional forests (northern spotted owl habitat).
 - Plant and animal biodiversity.
 - Important ecological connectivity corridors.

- **Community and Culture.**
 - Recreation opportunities (motorized and non-motorized).
 - Roadless and unmanaged areas.
 - A sustainable flow of goods and services.
 - Human life and property.

IV. Threats to Values

Subsequent community workshops reviewed and prioritized threats to these values. Threats were categorized as either environmental/ecological, management practices, or social. Environmental threats include high severity wildfire, overstocking (overly dense timbered stands), drought, and climate change. Threats related to management practices include fire suppression (lack of a disturbance process), single species management (including clearcutting or unsustainable management practices), and a fragmented approach to management (not taking a landscape approach). Social threats include impacts from unmanaged recreation (illegal camping, garbage, vandalism, unauthorized motorized use) and lack of agency capacity to complete restoration work.

V. Purpose and Need for Action

Over one hundred years of fire exclusion, subsequent fuel accumulations, and natural and human-caused disturbances in this watershed's ecosystem now present conditions that could substantially interrupt the conditions and processes that provide important nature's benefits. The underlying **need** for action is to restore ecological and social conditions and processes in the Upper Applegate watershed to provide for landscape conditions resilient to disturbances and climate change. "Restoration means creating and maintaining healthy, resilient forests capable of delivering all the benefits that people get from them." (<https://www.fs.fed.us/restoration/>).

The **Purpose** of the action is to protect and enhance the important community and agency identified values through the attainment of the following goals:

Water and Aquatic Habitat – *Improve watershed conditions and reduce road-related impacts to natural resources. To achieve this, there is a need to:*

- Minimize road related impacts on water quality and quantity and aquatic habitat.
- Maintain or improve important aquatic habitat features so they are sustainable over time.

Terrestrial Biodiversity – *Improve ecosystem resilience and function at the landscape scale in order to sustain healthy forests and watersheds for future generations. To achieve this, there is a need to:*

- Manage forest structure and species composition to increase biodiversity.
- Restore fire-adaptive species in the ecosystems, thereby encouraging more fire-resilient forests allowing the re-establishment of the ecological role of fire.
- Develop and maintain habitat connectivity.
- Maintain/enhance late-successional habitat.
- Protect legacy features such as ponderosa and sugar pine, and oak savannas.
- Minimize introduction and spread of non-native species including noxious weeds.
- Restore landscapes to more resilient conditions by providing a mosaic of seral stages.

Community and Culture – *Provide protection to communities at risk from wildland fire, provide for sustainable recreation opportunities, and to improve community involvement for stewardship of the land to foster a respect for ecosystems and the processes that maintain them. To achieve this, there is a need to:*

- Reduce risk to communities and other developed areas from wildland fire.
- Provide sustainable recreation opportunities in response to changing demand.
- Minimize unauthorized recreational and other uses (OHV, camping, dumping, etc.).
- Promote small innovative forest products and restoration by-products.
- Foster a collaborative approach to land management.
- Improve community awareness of our stewardship of the land and foster a respect for ecosystems and the processes that maintain them.



VI. Proposed Action

In order to conserve or promote resiliency in ecosystems, the Forest Service and BLM, in collaboration with local communities and stakeholders, identified opportunities to achieve the restoration of physical and biological processes and patterns that create and maintain diverse networks of habitats and populations while recognizing the need for protection of socio-economic values. The function of the Proposed Action is to obtain the stated Purpose and Need to a high degree, while minimizing adverse environmental effects.

Treatments identified in the proposed action would occur on federal lands throughout the entire Upper Applegate watershed. In the long-term, it is anticipated that the actions proposed herein will facilitate a return to conditions where landscapes are more resilient to natural disturbance processes. Actions addressing recreation values are designed to minimize impacts on ecological conditions and functions.

During the collaborative planning process, other actions that would not require a NEPA analysis were identified by the agencies and community. Some actions would be an assessment, strategy, or plan that would inform this analysis and some would require additional planning before identifying a specific action. These actions are listed in Appendix A.

Figure 1-1 displays the Upper Applegate watershed where all activities included in the Proposed Action would occur. It also displays lands administered by the Forest Service and BLM. Proposed activities would only occur on federally managed lands.

Figure 1-1. Upper Applegate Watershed Restoration Project Vicinity Map

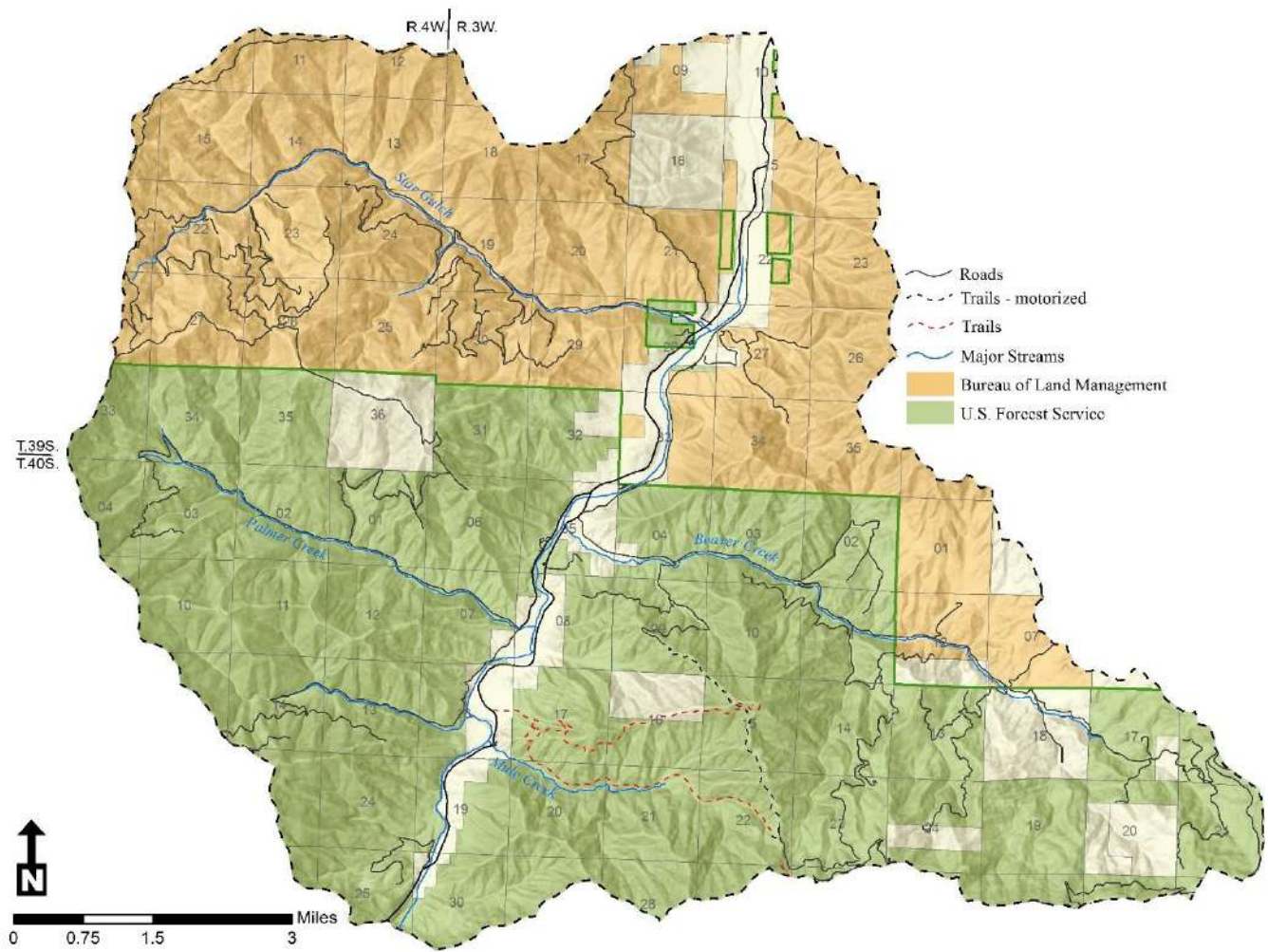


Table 1-1 lists the proposed activities that are included in this analysis. Opportunities identified by the community and the agencies address the needs associated with key values. The table describes the goals to protect, enhance, or maintain the important values for water and aquatic habitat, terrestrial biodiversity, and community and cultural values. Also identified are potential benefits from nature that would be addressed by those activities.

Table 1-1. List of proposed activities

Purpose	Proposed Action Opportunity	Estimated Outcomes	Benefits from Nature
Water and Aquatic Habitat: Improve watershed conditions and reduce road-related impacts to natural resources.	A-3 Road Restoration	Improves drainage structures on approximately 3 miles of existing roads, reduces the potential for future road-related failures, and reduces impacts to water quality and aquatic habitat by decreasing the amount of sediment delivered to streams. Would also improve groundwater storage by preventing interception and runoff. Would provide improved access for wildfire suppression or prescribed burning operations.	<ul style="list-style-type: none"> • Wild fish. • Clean cold water. • Water storage and regulation. • Aquatic species and habitat diversity. • Aesthetics. • Recreation and public health. • Jobs.
	A-5 Riparian Restoration	Treating stands dominated by seedlings, saplings, and poles in Riparian Reserves would accelerate development of desired vegetative conditions that include improved stand conditions; expedited growth of residual trees; and enhanced fire resiliency on approximately 2% of Riparian Reserves on the Forest Service portion of the watershed.	<ul style="list-style-type: none"> • Wild fish. • Stream temperature (clean, cold water). • Aquatic species and habitat diversity. • Aesthetics. • Recreation and public health. • Jobs.
Terrestrial Biodiversity: Improve ecosystem resilience and function at the landscape scale in order to sustain healthy forests and watersheds for future generations.	T-1 Botanical habitat enhancement	Increases or maintains plant species richness, composition and cover within 10% of the landscape mapped as native plant community biodiversity hotspots. Enhances habitat and population viability for the Endangered plant <i>Fritillaria gentneri</i> (FRGE). These treatments would maintain and enhance oak and other hardwoods, as well as pine, in order to promote local special status plant species and support non-timber forest product harvesting. This would be accomplished by a combination of the use of prescribed fire and only thinning or removal of conifers in other units.	<ul style="list-style-type: none"> • Biodiversity. • Cultural and intrinsic values. • Scientific and educational. • Nutrient cycling/Soil fertility. • Water quality. • Plant/Pollinator mutualism. • Traditional cultural uses. • Food and medicines. • Recreation.
	T-3 Thinning and prescribed fire in natural stands	Treatment would enhance forest complexity and diversity in un-managed forested stands. Variable density management would involve the selective removal of some trees within a forested stand to increase spacing and accelerate growth in the crowns and root systems of the remaining trees. This would primarily involve smaller diameter trees in overly-dense stands. Variable density management is used to improve forest health of	<ul style="list-style-type: none"> • Timber products. • Wildlife species diversity and late-successional habitat. • Jobs.

Purpose	Proposed Action Opportunity	Estimated Outcomes	Benefits from Nature
		stands, to open the forest canopy for selected trees, to accelerate growth to maintain desired seral conditions, or to attain late-successional characteristics for biological diversity. Prescribed fire would be allowed to regulate the existing fuel profile and to create more of a mosaic of fuel loadings and canopy closures.	<ul style="list-style-type: none"> • Water storage and flow regulation • Climate regulation. • Biodiversity. • Recreation and public health. • Cultural and intrinsic values.
	T-5 Thinning and prescribed fire in previously managed stands	Would place young stands on developmental paths toward improved vigor, increased growth, greater resistance to disturbance, and desired species composition and structure.	<ul style="list-style-type: none"> • Traditional cultural and forest products. • Timber products. • Wildlife species diversity and habitat. • Jobs. • Aesthetic and spiritual values. • Climate regulation. • Stream temperature (clean, cold water). • Aquatic species and habitat diversity.
Community and Culture: Provide protection to communities at risk from wildland fire, provide for sustainable recreation opportunities, and to improve community awareness for stewardship of the land to foster a respect for ecosystems and the	C-2 Maintenance of fuels in previously treated areas using prescribed fire and small-diameter thinning.	Fuels treatments would reduce wildfire hazard, risk, and negative impacts to communities and infrastructure and landscapes, improve biodiversity, and minimize impacts to highly valued resources including water quality and quantity, recreation use, and late-successional habitat. Participation with communities bordering federal lands in partnership with local stakeholders would reduce risks and threats from wildland fire.	<ul style="list-style-type: none"> • Environmental education. • Biodiversity • Water quality and quantity • Jobs. • Aesthetic and spiritual values. • Recreation and public health.
	C-3 Provide additional opportunities for non-motorized recreation	New non-motorized trail construction/designation including the “Tallowbox Trail” and the “Applegate Ditch Trail” and trailheads at Flumet Flat, Kanaka Flat, and Brushy Gulch would provide increase in non-motorized trails in the Upper Applegate watershed. Trails could be utilized during prescribed burning operations.	<ul style="list-style-type: none"> • Environmental education. • Jobs. • Aesthetic and spiritual values. • Recreation and public health. • Prescribed fire infrastructure

Purpose	Proposed Action Opportunity	Estimated Outcomes	Benefits from Nature
processes that maintain them.	C-4 Decommission un-authorized OHV trails and restore dispersed recreation site.	Unauthorized OHV routes would be decommissioned in the area east of Jackson Campground and in the Brushy Gulch area. The Placer dispersed use area would be restored.	<ul style="list-style-type: none"> • Environmental education. • Jobs. • Aesthetic and spiritual values. • Recreation and public health. • Enhanced habitat connectivity. • Improved water quality and storage.
	C-6 Restore trail to access McKee Bridge Picnic Area	Would re-establish the trail from Eastside Road to McKee Bridge Picnic Area that allows access to the picnic area.	<ul style="list-style-type: none"> • Environmental education. • Jobs. • Aesthetic and spiritual values. • Recreation and public health..
	C-7 Provide additional opportunities for motorized recreation.	Would provide three additional motorized use opportunities over current condition including re-establishing the Cinnabar and Charlie Buck trails and creating a new trail in Hanley Gulch.	<ul style="list-style-type: none"> • Environmental education. • Jobs. • Aesthetic and spiritual values. • Recreation and public health. • Prescribed fire infrastructure.

VII. Decision Framework

This Environmental Assessment (EA) is not a decision document. Its main purpose is to disclose and allow public comment on the consequences that could result from implementation of the Proposed Action. Decisions regarding which, if any, elements of the Proposed Action will be selected for implementation, will be documented in a Decision Notice (DN).

Accordingly, the EA focuses on providing analysis sufficient to ultimately make the following Federal decisions:

- What treatments will the Forest Service and BLM authorize, and under what conditions?
- What mitigation and monitoring measures will be required if an Action Alternative is selected?

In cooperation, Responsible Officials representing the Siskiyou Mountains Ranger District of the Rogue River-Siskiyou National Forest and the Ashland Field Office of the Medford District, Bureau of Land Management have led the analysis, guided the interdisciplinary team and coordinated the public involvement process.

Important factors in consideration of this decision will be the response between and attainment of the overall Purpose and Need. In addition to and concurrent with attainment of Purpose and Need, the response of alternatives in relation to the identified Relevant Issues will be used as important decision factors. No one element of Purpose and Need or Relevant Issue will be used to make the decision, rather, they will be reviewed together with an assessment of tradeoffs to make the final decision.

VIII. Management Direction

Land management direction for the Upper Applegate watershed is contained in two separate documents: one for lands administered by the Rogue River-Siskiyou National Forest; and one for the lands administered by the Medford District Bureau of Land management. Although both land management plans contain similar allocations (i.e., Riparian Reserves), each plan is unique.

Forest Service land management direction is contained in the 1990 Rogue River National Forest Land and Resource Management Plan (RRNF LRMP) as amended by the 1994 Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl, commonly known as the Northwest Forest Plan (NWFP).

The Southwestern Oregon Record of Decision and Resource Management Plan (2016 ROD/RMP) provides overall direction for the management of resources on BLM-administered lands in the Medford District Bureau of Land Management². This approved RMP includes management objectives and management direction for land use allocations and for resource programs. Management objectives are descriptions of desired outcomes for BLM-administered lands and resources in an RMP; the resource conditions that the BLM envisions or desires would eventually result from implementation of actions consistent with the RMP. Land use allocations and management direction are designed to accomplish RMP objectives.

Pertinent information such as management objectives, management direction, and standards and guidelines contained within these two management plans is incorporated by reference as part of this environmental analysis.

IX. Other Relevant Studies or Analysis

a. The Applegate Fire Plan

The Applegate Fire Plan was conducted as a collaborative project with local citizens and federal agency participants. Due to extensive participation throughout the Applegate Valley, overall project coordination was arranged by the Applegate Partnership, a non-profit community-based group, founded in 1992. Initial funding was awarded to the Applegate Partnership via the National Fire Plan program in 2001.

An excerpt from the Applegate Partnership mission statement states: “Through community involvement and education, this partnership supports management of all land within the watershed in a manner that sustains natural resources and that will, in turn, contribute to economic and community well-being and resilience”.

² BLM’s 1995 Medford District Resource Management Plan incorporated the Northwest Forest Plan’s land use allocations and standards and guidelines. The BLM’s 2016 Southwest Oregon Resource Management Plan replaced BLM’s 1995 Resource Management Plan and thereby replaced the Northwest Forest Plan for the management of BLM-administered lands in western Oregon (USDI BLM 2016a, p. 21).

The Applegate Fire Plan provides an overall view of the watershed and its relationship with fire, historically and presently, and suggests ways to improve conditions from an individual private property owner perspective, as well as from a community perspective. It also identifies high-risk areas and provides strategies to local agency land managers and landowners who voluntarily want to participate with their state or federal neighbors in developing “borderless” fuel reduction strategies. Pertinent information contained within the Applegate Fire Plan is incorporated by reference as part of this environmental analysis.

b. Applegate Adaptive Management Area Guide

The Applegate Adaptive Management Area Guide includes an overview of known information about the Applegate River watershed, covering topic such as: geology, vegetation and fire, stream areas and wildlife, native peoples, Euro-American settle, and social and economic setting. Therefore, pertinent information contained in this Guide is incorporated by reference as part of this environmental analysis.

c. Applegate River Watershed Assessment: Aquatic, Wildlife, and Special Plant Habitat

This assessment of the health of the ecosystem plays an important role in providing for the identification and protection of aquatic and riparian habitats. Key processes and functions were identified within the watershed, important for maintaining a healthy ecosystem so restoration opportunities can be planned for during future project scale analyses. Pertinent information contained in this assessment is incorporated by reference as part of this environmental analysis.

d. Applegate Adaptive Management Area Ecosystem Health Assessment

This assessment was an initial evaluation of the conditions in the Applegate River watershed, focusing on long-term forest health of terrestrial biophysical components including what areas are at risk to fires. Therefore, pertinent information contained in this assessment is incorporated by reference as part of this environmental analysis.

e. Watershed Analyses

Watershed analysis focuses on collecting and compiling information within the watershed that is essential for making sound management decisions. It is an analytical process, not a decision-making process with a proposed action requiring NEPA analysis. Watershed analysis has a critical role in providing for aquatic and riparian protection.

In land management planning, the overall watershed condition and the array of processes occurring need to be considered. Watershed condition includes more than just the state of the channel and riparian area. It also includes the condition of the uplands, distribution and type of seral classes of vegetation, land use history, effects of previous natural and land-use related disturbances, and distribution and abundance of species and populations throughout the watershed.

The Upper Applegate watershed was covered by three watershed analysis assessments including: Squaw/Elliott/Lake Watershed Analysis (USDA 1995), Beaver/Palmer Watershed Analysis (USDA 1994) and Applegate-Star/Boaz Watershed Analysis (USDA and USDI 1998). Information from these analyses contributed to this environmental analysis, and these reports are incorporated by reference.

f. Applegate River – McKee Bridge Legacy Roads Project

In December 2009, a decision was signed to decommission 28.33 miles of roads, close 6.86 miles of roads, and stormproof 44.15 miles of roads within the Applegate River–McKee Bridge 5th field watershed within the Siskiyou Mountains Ranger District. The work authorized by this decision was implemented in 2010 and 2011. Pertinent information contained in this assessment is incorporated by reference as part of this environmental analysis.

g. Travel Management Rule

On November 9, 2005, the Final Rule for Travel Management: Designated Routes and Areas for Motor Vehicle Use (Travel Management Rule) was published in the Federal Register. This rule became effective in December 2005. The Travel Management Rule revises several regulations to require identification of roads, trails, and areas for motor vehicle use on National Forests and National Grasslands. There are two parts to this rule.

Subpart A of the Travel Management Rule requires that each National Forest maintain an appropriately-sized and environmentally-sustainable transportation system. The RR-SNF completed a “minimum roads analysis” to meet the requirements of Subpart A. This Travel Analysis Process (TAP) is not a decision making process; it is an assessment of the existing condition of the current road system and was designed to inform project-level analysis. Pertinent information regarding motorized use is incorporated by reference as part of this environmental analysis.

Subpart B was implemented by a Record of Decision (ROD) for the Rogue River-Siskiyou National in May 2016. This decision designated approximately 4,434 miles of roads open to public travel, with 3,082 open to mixed-use that includes both highway-legal and off-highway vehicles. The remaining 1,352 miles of roads are open to highway-legal vehicle use only. This decision also designated 180 miles of trails that allow motorized use. From the ROD: “... *this decision does not preclude future travel management proposals. Route construction, reconstruction, or re-designation may be necessary in the future. Those needs may be addressed, as appropriate, under a separate decision making process.*” Pertinent information regarding motorized use is incorporated by reference as part of this environmental analysis.

X. Public Involvement and Issues

Multiple workshops and meetings were held beginning in September 2015 which led to the development of a collaboratively-developed Proposed Action. In early August 2017, a scoping letter was mailed to people who have expressed interest in Forest Service and BLM projects.

In order to seek current tribal views on the Proposed Action and identify ongoing traditional uses or other concerns about the area, prior to initiating public scoping for the Upper Applegate Watershed Restoration Project, the Forest Service formally contacted and invited consultation with the federally recognized tribes associated with the Rogue River-Siskiyou National Forest: Confederated Tribes of Siletz Indians of Oregon, the Confederated Tribes of the Grand Ronde Community of Oregon, the Coquille Tribe, the Cow Creek Band of the Umpqua Tribe of Indians, Elk Valley Rancheria, the Tolowa Dee-ni Nation, the Klamath Tribes, and the Quartz Valley Indian Reservation (Ft. Jones, CA).

Additionally, the project was listed on the Forest's Schedule of Proposed Actions (SOPA) and there were numerous articles that chronicled the planning process in the Applegater Newspaper³ (a local community quarterly newspaper). Due to large fires on the Siskiyou Mountains Ranger District that began in late August and extended through the end of September, the deadline for scoping comments was extended to November 2017. Forty-two responses were received (thirty-two were form letters and the remaining ten were from individuals and organizations) in addition to comments received at the community meetings.

Following release of the scoping letter, community involvement continued with a series of public workshops beginning in March 2018. Subsequent meetings were held in May, June, July, and September. A public field trip was held in July to provide community members an opportunity to visit proposed treatment areas and discuss concerns. These workshops focused on the use of iterative NEPA and discussion of the Proposed Action including minor modifications (or iterations) while building relationships with the community (refer to Appendix A).

Based on scoping, issues were compiled into two classifications (1) Issues determined to be Out of Scope and (2) Relevant Issues.

a. Out Of Scope Issues

Out of Scope issues include points of discussion that are not relevant to the Proposed Action, including those that cannot be addressed with a project level analysis, issues already decided by law, regulation, or other higher level decisions, and issues received from the public that were found to be conjectural or non-substantive. The following Out of Scope Issues were raised by the public during the scoping process:

Development of Adaptive Management Area Standards and Guidelines: There has always been a desire on the part of the community to build upon the Applegate AMA Guide by developing standards and guidelines appropriate to the entire AMA. Although this project only addresses a portion of the AMA, any processes or guidelines that are developed as part of this project, may be carried forward to future projects as appropriate.

Proposed motorized trails do not meet requirements of the 2016 BLM RMP or the RR-SNF MVUM. There needs to be enforcement of motorized use regulations. This issue involving the BLM's RMP and the RR-S MVUM cannot be addressed by a single project. Any decisions made based on this EA would be consistent with the direction in these two documents. Enforcement of motorized use regulations will continue depending on current law enforcement priorities. Note that recreation user conflicts and sound disturbance related to motorcycle use are addressed as relevant issues.

Upper Applegate Restoration Project does not acknowledge the underlying legal direction for the management of BLM on O&C lands⁴. This issue relates to the O&C Act. There is no commercial timber removal proposed on BLM administered lands under this project. Direction for management on O&C lands is contained in the BLM's 2016 Resource Management Plan.

³ The official newspaper of record for legal notices for the Siskiyou Mountains Ranger District is the Medford Mail Tribune. Scoping for an environmental assessment does not require a legal notice. A legal notice that will initiate the formal comment period will be posted in the Tribune.

⁴ O&C lands refers to the Oregon and California Railroad Revested lands. These lands lie in a checkerboard pattern through eighteen counties of western Oregon. Most of the O&C lands are administered by the Bureau of Land Management.

b. Relevant Issues

Relevant issues are those issues identified during the scoping process. They are relevant because of the extent of their geographic consequence, the duration of the effects, or the intensity of interest or resource conflict.

Relevant issues also act to determine the appropriate depth of the environmental analysis of the Proposed Action and identify potentially associated environmental effects. The relevant issues are listed without consideration for priority or importance.

The following relevant issues were identified by the public during the scoping process:

Botanical Populations and Habitat: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect the viability and resilience of native botanical species, in particular the Endangered *Fritillaria gentneri*, and habitats, including Forest Service Sensitive species.

Recreation: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect the quality (user experience) of recreation or change public use of recreation facilities and may affect the safety of the recreating public.

Sound Disturbance: Noise from proposed restoration-related operations (e.g., ground-based machinery, helicopters, etc.) combined with motorized use related to recreation, may disturb surrounding residents.

Late-Successional Habitat: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect late-successional habitat characteristics, habitat connectivity, and designated Critical Habitat.

Inventoried Roadless Areas: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect the character of Inventoried Roadless Areas (IRA), other areas with roadless character (some people may value these areas for their undisturbed or spiritual character), or lands with wilderness characteristics (LWC).

Sediment Delivery: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect water quality via erosion and resultant sediment delivery to streams.

Old and Large Trees: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect late seral or old-growth vegetative conditions and old or large trees. This may cause a change in amenity values for recreation use and/or existence values for those who believe such conditions should be preserved on public lands.

The following issues were identified by agency resource specialists and are used to disclose consequences relevant to the Upper Applegate watershed or whose disclosure of effects is required by agency policies or law. Analysis of these issues contributes to informing the decision maker.

Soil and Site Productivity: Activities associated with restoration treatments and new trail development, along with other connected actions, may alter soil characteristics through combustion, compaction, erosion, and structural modification and/or removal of coarse organic matter.

Hydrologic Function: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect hydrologic conditions within the Upper Applegate watershed, including channel morphology, runoff, stream flow, temperature, quantity and quality of water sources, peak flows, and listing status for Oregon Department of Environmental Quality (303(d) listed waterbodies.

Cumulative Watershed Effects: Activities associated with restoration treatments and new trail development, along with other connected actions, in combination with past, other current, and reasonably foreseeable future actions, may result in adverse cumulative watershed effects to hydrologic function and water quality.

Terrestrial Wildlife: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect terrestrial wildlife species and habitats, including, Forest Service Sensitive species, Northwest Forest Plan Survey and Manage Species, Management Indicator Species, migratory birds, and pollinators.

Big Game Winter Range: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect Big Game Winter Range, in particular thermal and hiding cover.

Threatened and Endangered Wildlife Species: Activities associated with restoration treatments and new trail development, along with other connected actions, may directly or indirectly affect Threatened or Endangered terrestrial wildlife species and/or Critical Habitat.

Aquatic Habitat and Fish: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect aquatic species and habitats, including Threatened, Endangered, or Sensitive species and/or Critical Habitat.

Riparian Reserves: Activities associated with restoration treatments and new trail development, along with other connected actions associated with riparian treatments may result in non-compliance with Forest Service Riparian Reserve NWFP Standards and Guidelines or BLM 2016 RMP

Aquatic Conservation Strategy: Activities associated with restoration treatments and new trail development, along with other connected actions on Forest Service lands may affect attainment of the NWFP Aquatic Conservation Strategy (ACS).

Non-Native Plant Species: Activities associated with restoration treatments and new trail development, along with other connected actions, may introduce or encourage exotic (non-native) and undesirable (noxious) plant species, or affect existing populations.

Heritage (Cultural) Resources: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect archaeological or historical sites and/or current Native American values.

Air Quality: Activities associated with restoration treatments and new trail development, along with other connected actions, may pose threats to public health and safety by temporarily reducing air quality from drifting smoke in residential areas and travelways.

Scenic Quality: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect the resulting visual character (evidence of management) and/or attainment of visual quality objectives for scenic quality.

Operational and Economic Feasibility: The design of restoration treatments may or may not be operationally feasible (are they possible?), and/or are they economically feasible (is there a way to fund treatments?)

Grazing Allotments: Activities associated with restoration treatments and new trail development, along with other connected actions, may affect allotment management practices and timing of use.

Information related to the consequences of implementing the Proposed Action in relation to the relevant issues is summarized in Chapter 3. Additional detail regarding the analysis of relevant issues is included in *Analysis of Relevant Issues for the Upper Applegate Watershed Restoration Project*, which is incorporated by reference and available upon request.



CHAPTER 2. PROPOSED ACTION

This Chapter describes in detail the Proposed Action for conducting management activities for the purpose of restoration of the Nature's Benefits identified for the Upper Applegate watershed by the community and agencies.

I. Assumptions for the Proposed Action

The “benefits from nature” concept was integrated into this planning process to underscore relationships between ecological, social and economic conditions in and around the Upper Applegate watershed. Restoring biological, physical and social processes and functions to ensure the long-term ecological sustainability of the public lands in the Upper Applegate watershed is important to the Forest Service, BLM, and the community.

During the collaborative planning process, activities that would not require new NEPA analysis were identified by the agencies. These activities would be implemented under a different NEPA decision or an assessment, strategy, or plan, however they would inform this analysis⁵. These activities are described in more detail in Appendix A to this document.

Iterative NEPA and the Proposed Action

The iterative NEPA process is intended to provide agencies with an efficient way to adjust proposals in response to public input. A collaborative process was used to develop the initial Proposed Action and continued collaboration with the community resulted in a refined proposal that is being carried forward through the environmental analysis. Appendix A has a description of the iterations of the Proposed Action from scoping to the action described in this EA.

There has been concern expressed about the iterative process particularly in regard to the inclusion of proposed trail development, particularly motorized trails. The iNEPA process is recommended for projects that are “... relatively straightforward or non-contentious” (Proceedings of the iNEPA Workshop, 2014).

When this point was raised by community members, the available options were to continue with the iterative process and drop the proposed trails or to utilize the more conventional NEPA process and develop an alternative to the Proposed Action that would not include the proposed trails. Because there was not unanimous support to drop the proposed trails (and this could be perceived as pre-decisional without adequate analysis), the agencies decided to continue to include the trails in the Proposed Action in order to have them analyzed to determine the effects (ecological and social) of implementation.

Rather than develop an alternative, all of the proposed activities were carried forward and analyzed. By analyzing the entire suite of activities and comparing each against the current condition, it gives the decision-makers the ability to select any or all of the activities for implementation.

Therefore, there is only one Proposed Action (with a suite of activities) that is being analyzed in this document. There is not a “No-Action” alternative include in this document. All of the activities are being analyzed against the current condition, which serves as the baseline for analysis.

⁵ A NEPA analysis is not required for development of a strategy (i.e., a community engagement strategy) or for actions that already have an existing decision from a previous NEPA analysis (i.e., Upper Applegate Road Hazardous Fuels Reduction Project). Although these projects have an existing decision, all effects of these project and any of the proposed activities would be analyzed together for cumulative effects.

This process being used by the agencies follows the goals from the Applegate AMA Guide to improve the capacity for local public problem-solving across boundaries; to use resources efficiently; to share knowledge freely and effectively; and to use adaptive management principles of testing, monitoring, and learning, and share this learning with all partners.

II. The Proposed Action

This project is aimed at restoring the important values (nature's benefits) identified by the community and agencies. The function of the Proposed Action is to obtain the stated Purpose and Need to a high degree, while minimizing adverse environmental effects. In order to conserve or promote resiliency in ecosystems, the Forest Service and BLM, in collaboration with local communities and stakeholders, identified opportunities to achieve the restoration of physical, biological, and social processes.

Treatments identified in the Proposed Action would occur on federal lands in the Upper Applegate watershed. Applicable Forest Plan and Resource Management Plan standards and guidelines, mitigation measures, Best Management Practices, and Project Design Criteria (PDC) would be used to minimize adverse effects from the proposed treatments.

a. Treatment Elements

To accomplish the objectives for the Proposed Action, a variety of treatment activities are identified. The various proposed treatments that would be used to implement the Proposed Action are described in more detail below.

Water and Aquatic Habitat

Improve watershed conditions and reduce road-related impacts to natural resources. To achieve this, there is a need to:

- *Minimize road related impacts on water quality and quantity and aquatic habitat.*
- *Maintain or improve important aquatic habitat features so they are sustainable over time.*

Specific actions under this category include restoration of roads that are eroding and a potential source of sediment and treating small diameter conifer trees in riparian areas to improve the long-term structure and function of riparian vegetation.

A-3 Road restoration

On Forest Service lands, an inventory and analysis of the transportation system was conducted Forest-wide for the Rogue River-Siskiyou NF to identify problem areas and opportunities for decommissioning, closure, or upgrade (i.e., surfacing, hydrological disconnect, change maintenance levels). The planning effort for the Upper Applegate Watershed Restoration Project looked at recommendations from the Forest-wide analysis and took a more detailed examination.

The following road restoration activities are designed to improve drainage structures on approximately 3 miles of existing roads. The objective is to reduce the potential for future road-related failures, and reduce impacts to water quality and aquatic habitat by decreasing the amount of sediment delivered to streams.

The following road segments have been identified (see Figure 2-1):

- FS Road 1010500 – although this road was decommissioned⁶ under the Applegate River – McKee Bridge Legacy Roads Project, it is still experiencing erosion and the Proposed Action would repair the impacts causing erosion on approximately 0.3 miles on the lower end of the road (T.39S., R.3W., east ½ of section 32).
- FS Road 2000920 – would repair existing conditions that are causing erosion and stormproof approximately 2.2 miles. Stormproofing⁷ would include blading the road to remove ruts, cleaning and repair of culverts by removing brush and debris, and reconstruct drainage features that are no longer functioning. The last 1,000 feet of the road is not surfaced and would be leveled to remove ruts and waterbars would be installed to divert water from moving down the road. Consider a temporary barrier (such as large rocks or log) to block the last 1,000 feet.
- Road 2000926 comes off of 2000920 and is planned to be used as a temporary spur during treatment operations for Unit 61. This spur would be decommissioned following completion of operations.
- Unnumbered FS spur (this road is located across Upper Applegate Road from Jackson Campground) – This activity would repair features causing erosion and stormproof approximately 0.5 mile of the road. Additionally, unauthorized spurs and OHV trails that come off of this road would be decommissioned. The road would be added to the Forest's road system as managed as a maintenance level 1 road (closed to public and administrative access until needed for management operations). An option to this treatment would be to decommission the road by obliterating and recontouring the entrance to prevent access and construct waterbars on the remaining length so rutting does not continue.

A-5 Riparian restoration

This treatment would target stands dominated by seedlings, saplings, and poles that are located within Riparian Reserves and within or adjacent to other vegetation treatments (Figure 2-2). The objective of this treatment is to accelerate development of desired vegetative conditions that include improved stand conditions; expedited growth of residual trees; and enhanced fire resiliency. This activity would result in treatment of approximately 85 - 100 acres within Riparian Reserves.

Variable density thinning within Riparian Reserves is also proposed in both managed stands and natural stands. These stands are primarily even-age as a result of clearcutting in the 1950's and 1960's or as the result of fire disturbance. This treatment aims to enhance structural and species diversity (conifer and hardwood), and result in a stand containing a variety of stand densities for development into late-successional conditions to meet Aquatic Conservation Strategies (USDA, USDI 1996). Stands in upland riparian reserves would retain at least 60 percent canopy cover and other habitat features.

The Proposed Action identifies some treatments that would occur within Riparian Reserves throughout the watershed. In general, areas within 25-feet of any drainage (perennial, intermittent, or ephemeral) would not be treated. Refer to the discussion of Project Design Criteria, this Chapter.

⁶ Road decommissioning is the physical treatment of a roadbed to restore the integrity of associated hillslopes, channels, and flood plains and their related hydrologic, geomorphic, and ecological processes and properties.

⁷ Stormproofing is a design philosophy and restoration work consisting of preparing the road to better withstand storm events and to be less dependent on recurrent road maintenance for drainage while reducing impact on other resources. It is the activity of reconstructing an existing road to better handle large storm events with minimal damage both to the road and the watershed into which it drains.

Figure 2-1. Map of A-3 Road Restoration Areas

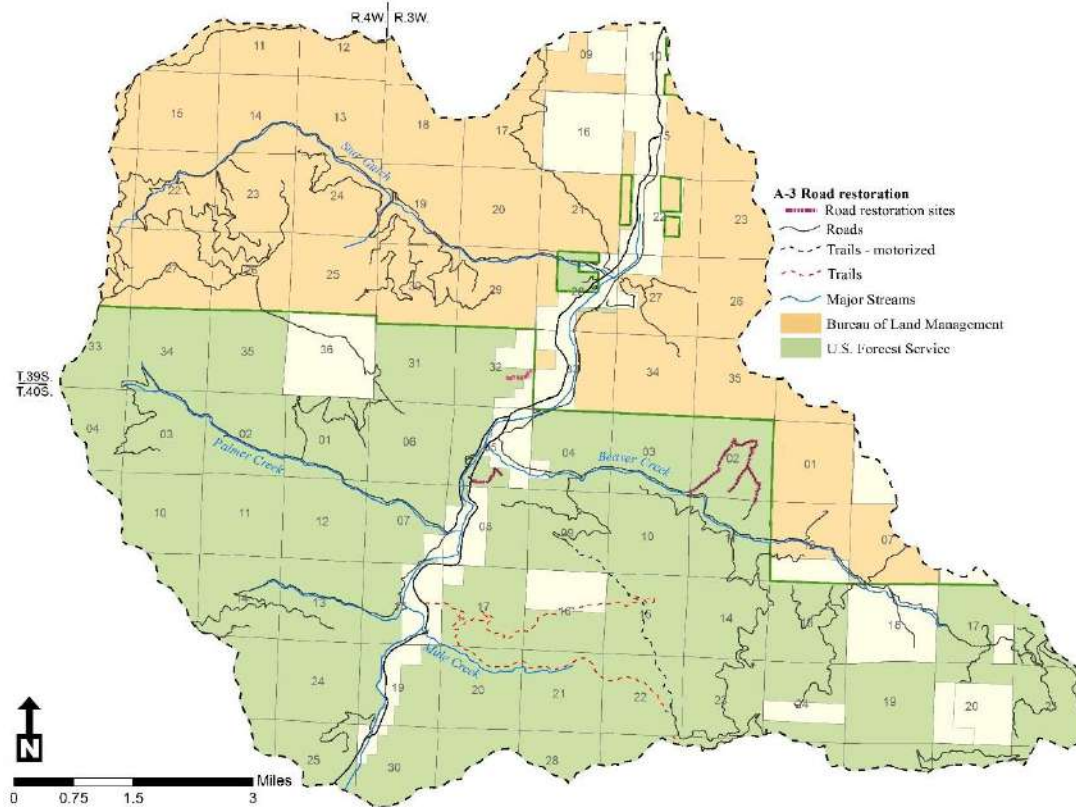
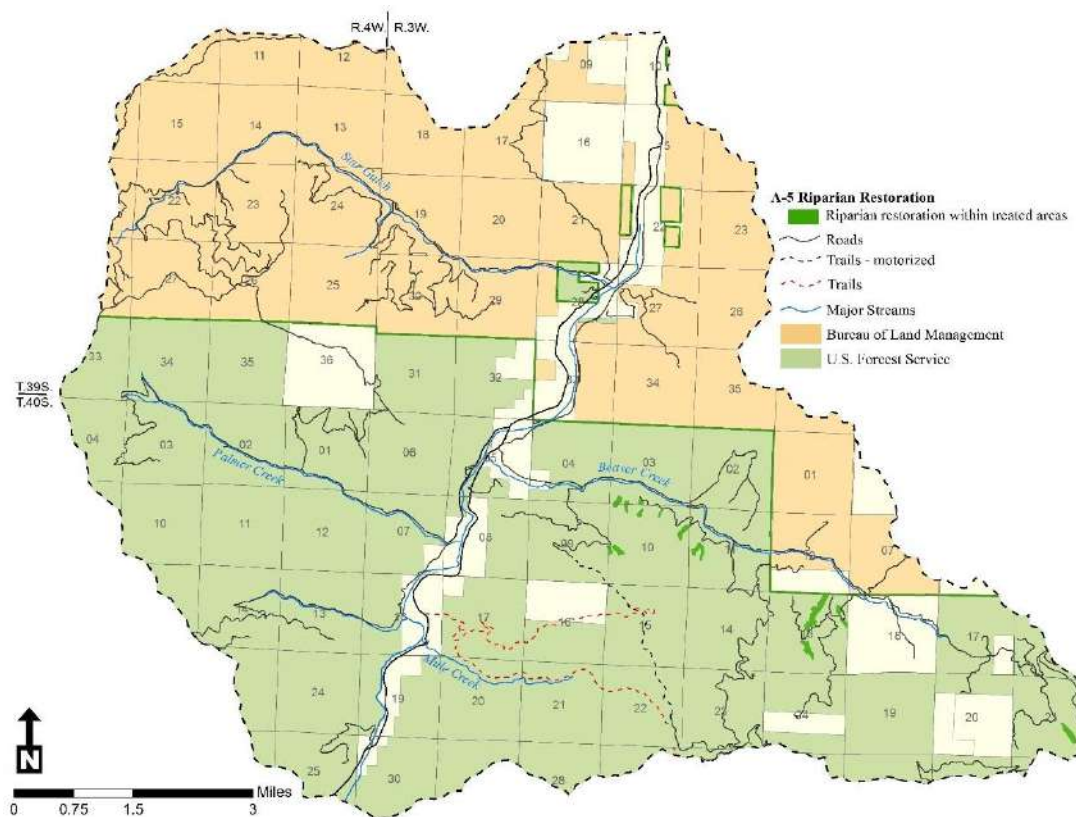


Figure 2-2. Map of A-5 Riparian Restoration Areas



Terrestrial Biodiversity

Improve ecosystem resilience and function at the landscape scale in order to sustain healthy forests and watersheds for future generations. To achieve this, there is a need to:

- *Manage forest structure and species composition to increase biodiversity.*
- *Restore fire-adaptive species in the ecosystems, thereby encouraging more fire-resilient forests allowing the re-establishment of the ecological role of fire.*
- *Develop and maintain habitat connectivity corridors.*
- *Maintain/enhance late-successional habitat.*
- *Protect legacy features such as ponderosa and sugar pine, oak savannas.*
- *Minimize introduction and spread of non-native species including noxious weeds.*
- *Restore landscapes to more resilient conditions by providing a mosaic of seral stages.*

Specific actions under this category include botanical habitat enhancement, the use of mechanical thinning and prescribed fire to restore resilience to natural and previously managed stands:

T-1 Botanical habitat enhancement (Figure 2-3)

***Fritillaria gentneri* Management Areas**

In partnership with the U.S. Fish and Wildlife Service and the Oregon Department of Agriculture, the Forest Service and the BLM would further implement the recovery strategy for *Fritillaria gentneri* following the methods outlined in a 2015 Conservation Agreement between the U.S. Fish and Wildlife Service and the Medford District of the Bureau of Land Management (USFW 2015). This would involve the development of *Fritillaria* Management Areas (FMAs), three of which are within the Upper Applegate watershed. The proposed boundaries for these three FMAs are included in this Proposed Action. Activities that would take place within these FMAs are:

- Survey, monitor and document all known *F. gentneri* populations and suitable habitat.
- Manage to minimize the effects of identified threats, maintain habitat, encourage natural population recruitment, and meet population size and stability criteria.
- Develop a management plan to address, at a minimum, the following components:
 - ✓ Habitat management, including non-native invasive plant control.
 - ✓ Best Management Practices (BMPs) for habitat treatments, road and trail maintenance, recreation management, timber sales, stewardship projects, fire suppression, and grazing.
 - ✓ Augmentation.
 - ✓ Herbivory mitigation.
 - ✓ Prevention and mitigation of off-highway vehicle impacts.
 - ✓ Signage.
 - ✓ Interpretation and education.
 - ✓ Implementation schedule.
 - ✓ Monitoring.
- Implement pilot studies to examine unproven treatments and techniques.
- Implement treatments to meet habitat management objectives.

Pollinator and Other Sensitive Plant Habitat Improvement

Habitat improvement would be carried out in the form of thinning encroaching conifers and brush, and seeding or planting of native pollinator plant species in restoration areas. Pollinator species used in restoration would be native and genetically appropriate to the area. Habitat improvement for sensitive plant species would focus on improving conditions for *Rhamnus ilicifolia*, *Toxicoscordion exaltatum*, *Tetrapteron graciliflorum*, and *Keckiella lemmonii*.

Fritillaria Management Areas (FMA's) are being designated as part of a partnership with US Fish & Wildlife Service. Prescriptions within habitat would follow guidelines set forth in the FMA plan currently in development. The FMA plan will identify parameters and guidelines related to conducting fuels management work in habitat for *Fritillaria gentneri*.

There are approximately 3,120 acres within proposed restoration units where this treatment could occur.

Habitat Restoration Monitoring Areas

In addition to the areas treated under the Pollinator and Other Sensitive Plant Habitat improvement activity described above, there are approximately 1,760 acres outside of vegetation treatment units that would be monitored. This provides an opportunity to track the conditions of these untreated areas and compare them to the treated areas. Future treatments in these monitored areas may be proposed or adjustments to the treated areas could occur depending on monitoring results.

Hardwood Enhancement

The proposed action is to develop a multi-aged mix of fire-resistant conifers, hardwoods, shrubs, grasses, and forbs. Legacy conifers and hardwoods would be retained with an abundance of hardwood patches, canopy gaps, and grassy openings dispersed throughout the stand.

Manual treatments would thin trees to reduce canopy closure, enhance gaps, maintain grassy openings, and promote shrub and understory development. Vegetation beneath and adjacent to large fire-tolerant conifers and hardwoods would be reduced to limit fire-related mortality. Young conifers would be removed to reduce the density within hardwood patches. Conifers that have grown through canopies of mature hardwoods would be girdled.

Activity-created fuels would be treated by either lop and scatter or pile and burn depending on volume and site conditions. Prescribed fire to reduce density of small trees, reduce litter accumulation, and stimulate native fire-dependent species could be used. Non-native invasive plants would be treated by hand-pulling, herbicide application, and prescribed fire.

For this treatment, there are 7 units totally approximately 320 acres (units 401 through 407).

Oak Enhancement

This action would help restore oak woodlands on lands administered by the BLM by minimizing encroachment of young conifers (typically less than 40 years old). Stand basal area would reflect historic density and is primarily composed of older tree cohorts, with sufficient younger oaks for recruitment to maintain the stand.

Where conifers are a natural component of the vegetation community, recruitment class is sufficient to maintain conifer presence without a measurable increase in basal area.

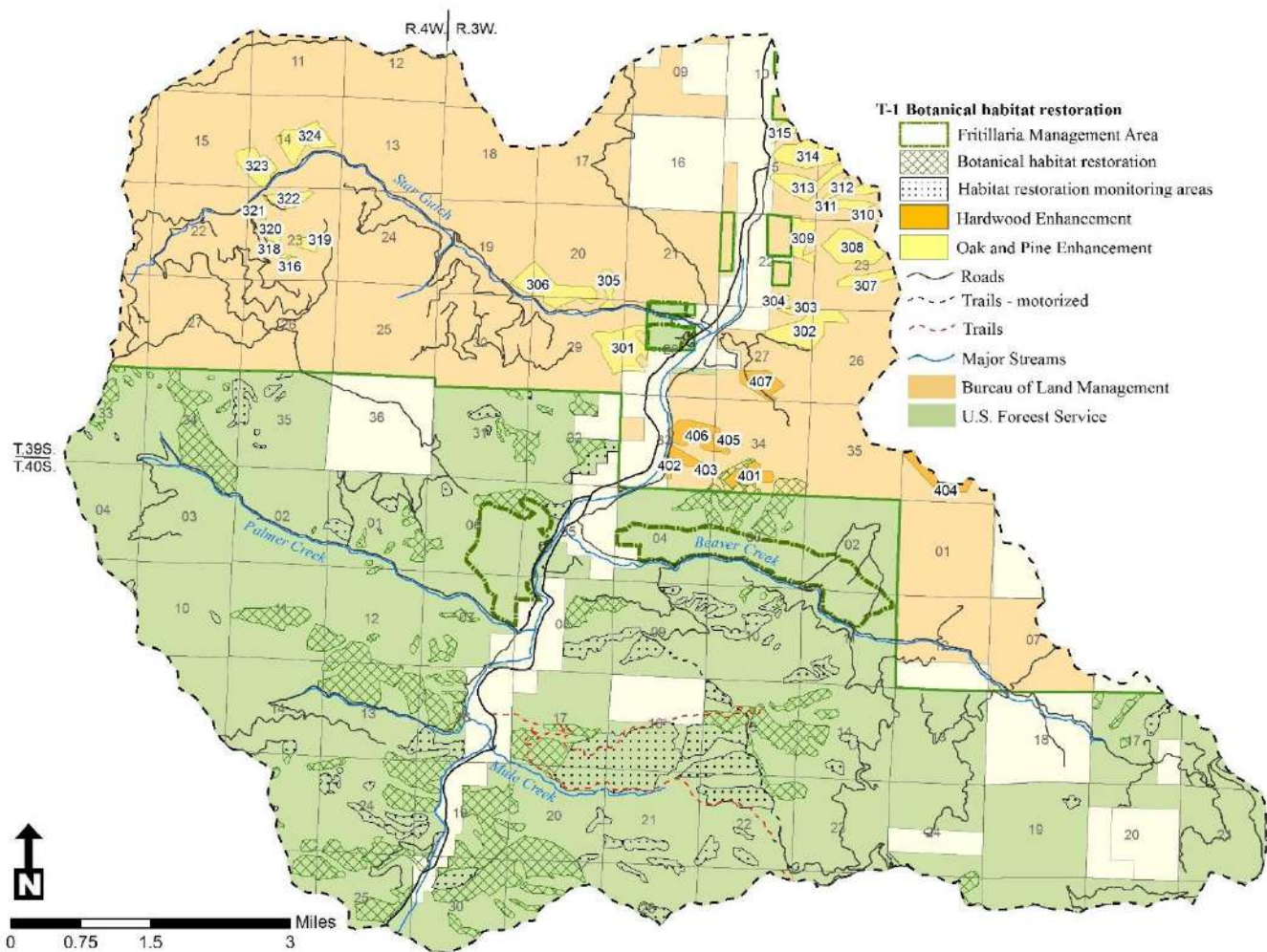
The treatments would remove young conifers and reduce the density of small hardwoods within the drip-line of mature oaks. Large conifers that have grown through canopies of mature oaks and other desirable hardwoods would be girdled. Conifers would be removed from oak clusters. Trees and shrubs would be manually thinned to maintain gaps, grassland openings, and edges.

Activity created fuels would be treated by either lop and scatter or pile and burn depending on volume and site conditions. Prescribed fire to reduce density of small trees, reduce litter accumulation, and stimulate native fire-dependent species could be used. Non-native invasive plants would be treated by hand-pulling, herbicide application, and prescribed fire.

For this treatment, there are 24 units totally approximately 1,190 acres (units 301 through 324).

Oak enhancement would also occur on Forest Service lands through implementation of T-3, Thinning and prescribed fire in natural stands and T-5, Thinning and prescribed fire in previously managed stands (plantations), both of which are described in this chapter.

Figure 2-3. Map of T-1 Botanical Habitat Enhancement Areas



T-3 Thinning and prescribed fire in natural stands.

Proposed treatments would enhance forest complexity and diversity in un-managed forested stands. Variable density management would involve the selective removal of some trees within forested stands to increase spacing and accelerate growth in the crowns and root systems of the remaining trees. This would primarily involve smaller diameter trees in overly-dense stands. Variable density management would be used to improve the overall health of stands, to open the forest canopy for selected trees, to accelerate growth to maintain desired seral conditions, or to attain late-successional characteristics for biological diversity. Prescribed fire would be allowed to regulate the existing fuel profile and to create more of a mosaic of fuel loadings and canopy closures.

The following treatments are included (refer to Figure 2-4):

Legacy Tree Thinning

Legacy⁸ tree thinning is proposed in both moist and dry forest conditions to maintain key ecological species on the landscape. This treatment is utilized to release individual or groups of legacy trees from fire suppression ingrowth. Clumps can be as small as two legacy trees or as large continuous clumps.

Legacy tree thinning involves the reduction of competing trees around dominant Douglas-fir, ponderosa pine, sugar pine, and oak individuals and legacy groups. The goal of the prescription is to utilize existing legacy tree structure to dictate where gaps would occur on the landscape. Legacy tree thinning would vary according to species. Stands receiving this treatment are generally over-dense, with high crown density and ladder fuels. Usually all large, dominant or pre-dominant trees are left. Methods are designed to treat stands in a way that achieves desired conditions that improve forest health and resiliency. The by-product of this treatment may have product value or in the case of trees generally less than 8-10 inches in diameter, no product value.

Whether the value of the by-product is captured would depend on several factors such as meeting ecological needs, location in relation to existing roads, feasibility of removing the material (operational and economic), and meeting Standards and Guidelines from the applicable land management plan.

Site-specific unit prescriptions would modify this treatment for legacy trees in riparian reserves, rare plant populations that do not require disturbance or are light intolerant, and where logging systems are not feasible or would cause damage to legacy trees. An estimated 700 – 1,500 MBF (thousand board feet) would be removed as a commercial product.

During legacy tree thinning, activity fuels would be created. Because hazardous fuel reduction treatments without follow-up slash treatment would only aggravate wildfire potential and behavior, activity fuels would be managed on all treatment areas to reduce subsequent fire behavior (see Activity Fuels Treatments discussion under [Connected Actions](#) for details).

Activity generated fuels resulting from thinning would be piled and allowed to cure, then would be treated in a timely manner, with the intent to reduce the fuel loading within one season of creation.

Table 2-1. Legacy tree units

Unit	Acres	Treatment	Logging System
41	150	Legacy Tree Treatment	Helicopter
42	90	Legacy Tree Treatment	Helicopter

Note: Unit acres are based on GIS analysis. Actual on the ground layout may vary unit size by as much as 5-10%.

Thinning With a Commercial By-Product

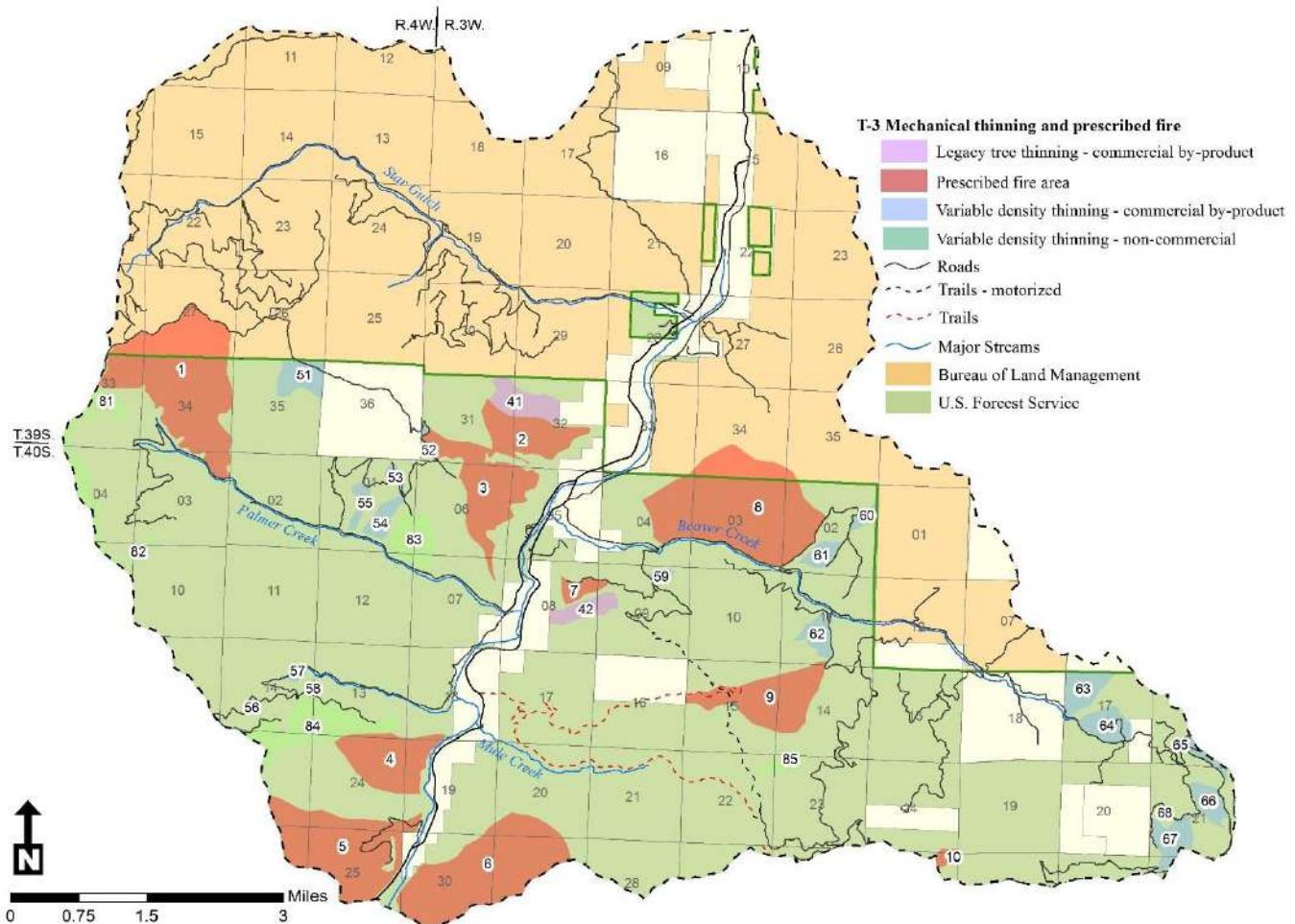
Variable density management refers to a range of non-uniform stand treatments that modify vegetation (i.e., reduce the density of existing trees) to achieve the desired objectives.

⁸ This refers primarily to large, old trees that were present prior to the beginning of fire exclusion treatments. For this analysis, these trees are defined as those pine or Douglas-fir over 150 years old (as determined by coring) or trees with a detectable fire scar or charred bark or tree with a diameter that is at least twice that of the average diameter for the stand it is located in. To be viable, these trees should have a live crown ratio of 25 percent or greater (live crown ratio refers to the ratio of the living crown to the total height of the tree).

Variable density management treatments under the Proposed Action are designed to reduce density, develop horizontal and vertical stand structure, and promote and maximize retention of legacy trees throughout the Upper Applegate watershed. Legacy trees include hardwoods and other species where those species are remnants of a previous stand.

Under the Proposed Action, while some level of treatment would occur, the density of leave trees would be varied to address high levels of insect risk, unstable areas, northern spotted owl core areas, Riparian Reserves, and legacy trees. All diameter and age classes are available for treatment based on a description of desired conditions.

Figure 2-4. Map of T-3 Thinning and Prescribed Fire Areas



Under this activity, material with commercial product value would be generated. However, it is not the focus of the treatment design. The focus of this treatment is to restore resilient stand conditions. An estimated 3,000 – 4,000 MBF (thousand board feet) would be removed as a commercial product.

In addition to variable density thinning, small openings between $\frac{1}{2}$ and $\frac{3}{4}$ acre may be created within the stand to provide for horizontal and vertical diversity. The area opened up within each unit would not exceed 20% of the total unit area. Group selection is intended to introduce structural diversity in an otherwise large homogeneous stand by mimicking the effects of a variety of natural disturbance processes (fire, wind, disease, etc.) that are essential for maintaining a healthy ecosystem.

Each opening is regenerated through natural seeding and planting to insure that the desired mix of species is obtained. The ½ acre or larger openings permit establishment of shade intolerant species such as ponderosa pine, and the result is a larger uneven-aged, more species-diverse forest. Group selection allows stands and landscapes to stay continuously forested while regeneration of each stand takes place over a long period of time with periodic entries.

The treatments for these units are divided into three categories. The northern spotted owl (NSO) habitat suitability model was used to determine which units would maintain NSO suitable nesting, roosting, and foraging (NRF) habitat; units that would downgrade NRF to dispersal habitat; and units that would maintain dispersal habitat.

During density management restoration treatments, activity fuels would be created. Because hazardous fuel reduction treatments without follow-up slash treatment would only aggravate wildfire potential and behavior, activity fuels would be managed on all treatment areas to reduce subsequent fire behavior (see Activity Fuels Treatments discussion under [Connected Actions](#) for details).

Activity generated fuels resulting from thinning would be piled and allowed to cure, then would be treated in a timely manner, with the intent to reduce the fuel loading within one season of creation.

Maintenance of these treated areas would mimic historical fire return intervals and help maintain stand conditions that would be consistent with low-mixed severity, fuel limited fire regimes.

Table 2-2. Commercial thin units

Unit	Acres	Treatment	Logging System
51	120	Thin and Rx fire, downgrade	Ground based/cable
52	20	Thin and Rx fire, maintain dispersal	Ground based
53	25	Thin and Rx fire, maintain dispersal	Cable
54	65	Thin and Rx fire, maintain dispersal	Helicopter
55	40	Thin and Rx fire, maintain dispersal	Helicopter
56	15	Thin and RX fire, maintain NRF	Cable
57	15	Thin and RX fire, maintain NRF	Cable
58	20	Thin and RX fire, maintain NRF	Cable
59	15	Thin and RX fire, maintain dispersal	Ground based/cable
60	30	Thin and Rx fire, maintain NRF	Ground based/cable
61	55	Thin and Rx fire, maintain NRF	Cable
62	75	Thin and RX fire, maintain NRF	Helicopter
63	110	Thin and Rx fire, maintain dispersal	Ground based
64	105	Thin and Rx fire, maintain dispersal	Ground based
65	40	Thin and Rx fire, maintain dispersal	Ground based/cable
66	80	Thin and RX fire, maintain NRF	Ground based/cable
67	110	Thin and Rx fire, maintain dispersal	Ground based/cable
68	10	Thin and RX fire, maintain NRF	Ground based/cable

Note: Unit acres are based on GIS analysis. Actual on the ground layout may vary unit size by as much as 5-10%.

Thinning With No Commercial By-product

This thinning includes the removal or rearrangement of dead and down wood on the forest floor and understory vegetation (generally shrubs and small trees up to 8 inches in diameter at breast height - DBH) which addresses the removal of ladder fuels⁹. This understory vegetation would be managed in various amounts to minimize or reduce the density and distribution of small trees and shrubs.

Within unstable areas (as identified by resource specialists) and Riparian Reserves, coarse woody material would be maintained in the upper end of the desired range to additionally provide for specific resource needs, such as soil stabilization, etc. Refer to the discussion of project design criteria, Section d. this Chapter.

During density management and legacy tree restoration treatments, activity fuels would be created. Because hazardous fuel reduction treatments without follow-up slash treatment would only aggravate wildfire potential and behavior, activity fuels would be managed on all treatment areas to reduce subsequent fire behavior (see Activity Fuels Treatments discussion under [Connected Actions](#) for details).

Activity generated fuels resulting from thinning would be piled and allowed to cure, then would be treated in a timely manner, with the intent to reduce the fuel loading within one season of creation.

Maintenance of these treated areas would mimic historical fire return intervals and help maintain stand conditions that would be consistent with low-mixed severity, fuel limited fire regimes.

For this treatment, there are 5 units totally approximately 730 acres (units 81 through 85).

Prescribed Fire

A prescribed fire is any fire ignited by management actions to meet specific objectives. Prescribed underburning involves the controlled application of fire to understory vegetation and coarse woody material. This would occur when fuel moisture, soil moisture, weather and atmospheric conditions allow for the fire to be confined to a predetermined area and desired fire intensity is utilized to achieve the planned resource objectives.

Where underburning is prescribed as the sole treatment for an area, follow-up maintenance burning would be needed in 5 to 8 years to remove the vegetation killed from the first prescribed underburn. A period of time between the initial and second underburn is needed to allow for protective soil cover (duff, litter, forbs) to rebuild for soil protection, and for the material killed by the first burn to fall to the forest floor.

A written prescribed fire plan, also referred to as a Burn Plan, is required to be developed prior to ignition and approved by the Agency Administrator (usually the District Ranger or Field Manager). Prescribed fire plans guide the implementation based on site-specific conditions (including fuel moisture and weather conditions) at the time of planned ignition, and provide for pre- and post-burn evaluation to monitor the burn and its effectiveness at meeting resource objectives. These defined conditions when burning could occur, are termed the “burn window.”

To meet State air quality requirements, prescribed burning would be implemented during periods of atmospheric instability (when weather disturbances are moving into or through the area) and air is not trapped on the valley floor by inversions. Presently, the majority of burning is carried out in the spring when fuel moisture and soil moisture levels are highest and air conditions offer more opportunities. This can limit the number of days when prescribed fire may be used.

⁹ Ladder fuels are vegetation located below the crown level of forest trees which can carry fire from the forest floor to tree crowns. Ladder fuels may be low-growing tree branches, shrubs, or smaller trees.

While fall burns present challenges to fire managers, such as increased temperatures, erratic winds, lower fuel moisture and increased fire behavior, conducting prescribed burns at this time may reduce adverse effects to non-target plant and wildlife species. Under the Proposed Action, prescribed fire would be utilized any time of the year when desired resource objectives can be attained.

Maintenance of these treated areas would mimic historical fire return intervals and help maintain stand conditions that would be consistent with low-mixed severity, fuel limited fire regimes.

Table 2-3. Prescribed fire units

Unit	Acres	Treatment	Logging System
1	945	RX Fire	N/A
2	255	RX Fire	N/A
3	425	RX Fire	N/A
4	335	RX Fire	N/A
5	655	RX Fire	N/A
6	800	RX Fire	N/A
7	60	RX Fire	N/A
8	1,040	RX Fire	N/A
9	370	RX Fire	N/A
10	25	RX Fire	N/A

Note: Unit acres are based on GIS analysis. Actual on the ground layout may vary unit size by as much as 5-10%.

T-5 Thinning and prescribed fire in previously managed stands (plantations)

Treatments proposed under this activity (see Figure 2-5) would place young stands on developmental paths toward improved vigor, increased growth, greater resistance to disturbance, and desired species composition and structure. Treatments would be designed to improve stand conditions; expedite growth of residual trees; and enhance fire resiliency. Additionally, prescribed fire would be used as follow up to initial treatments to enhance and maintain resilient conditions.

Thinning With a Commercial By-product

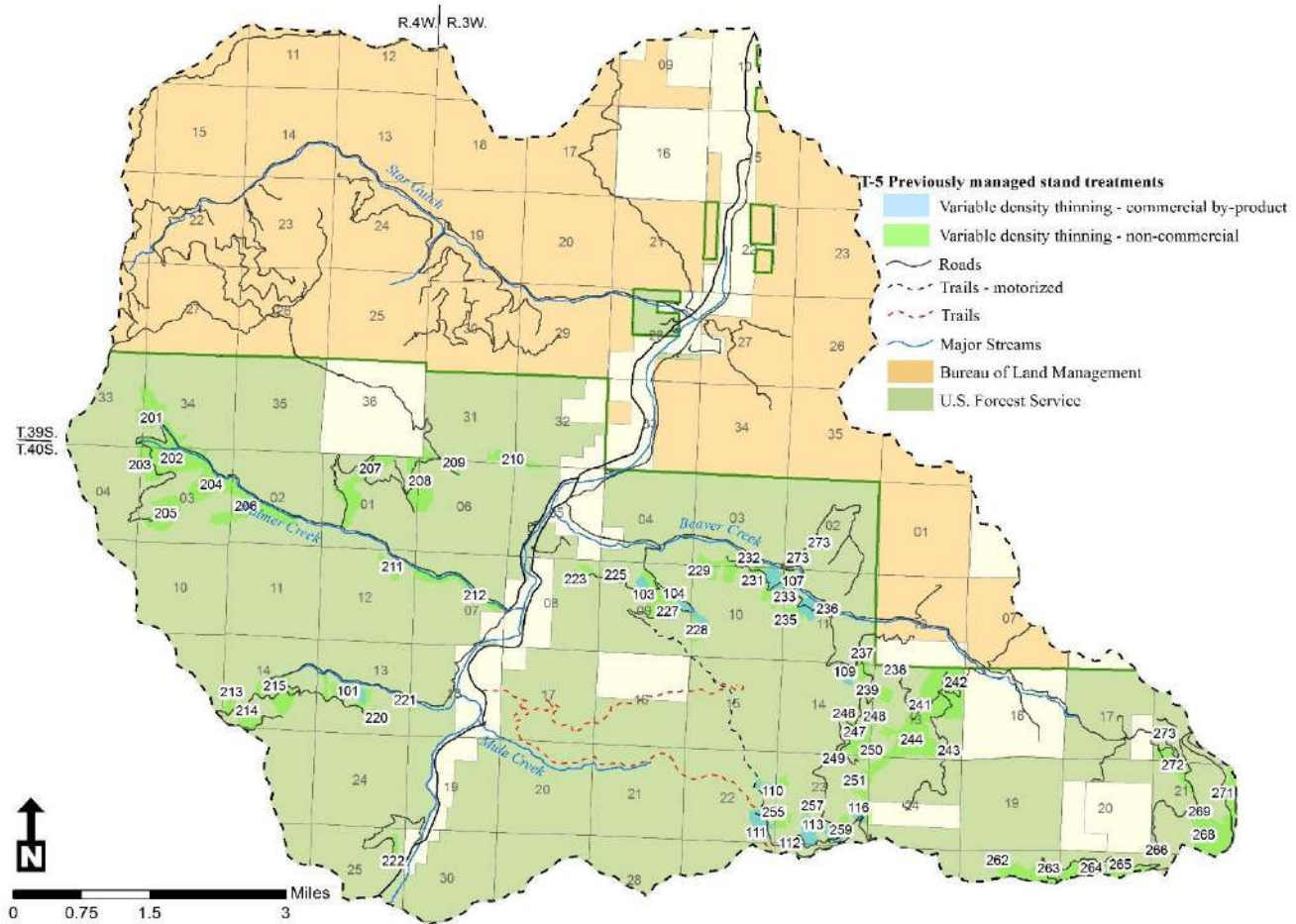
Variable density management refers to a range of non-uniform stand treatments that modify vegetation (i.e., reduce the density of existing trees) to achieve the objectives described above for each element. Under the Proposed Action, while some level of treatment would occur, density would be varied depending on location and specific objectives. All diameter and age classes are available for treatment based on a description of desired conditions. These stands are currently classified as dispersal habitat for the northern spotted owl. This treatment is designed to maintain 40% canopy cover to continue to provide dispersal habitat. Under this activity, material with commercial product value would be generated, however, it is not the focus of the treatment design. The focus of this treatment is to restore resilient stand conditions.

Additionally, small openings are between $\frac{1}{2}$ and $\frac{3}{4}$ acre may be created within the stand to provide for horizontal and vertical diversity. The area regenerated within each unit would not exceed 20% of the total unit area. Group selection is intended to introduce structural diversity in an otherwise large homogeneous stand by mimicking the effects of a variety of natural disturbance processes (fire, wind, disease, etc.) that are essential for maintaining a healthy ecosystem.

Each opening is regenerated through natural seeding and planting to insure that the desired mix of species is obtained. The ½ acre or larger openings permit establishment of shade intolerant species such as ponderosa pine, and the result is a larger uneven-aged, more species-diverse forest. Group selection allows stands and landscapes to stay continuously forested while regeneration of each stand takes place over a long period of time with periodic entries.

These treatments are designed to promote and maximize retention of any legacy trees found within the plantations. Legacy trees can also include hardwoods and other species where these species are remnants of a previous stand.

Figure 2-5. Map of T-5 Thinning and Prescribed Fire in Previously Treated Areas



An estimated 1,000 – 2,000 MBF (thousand board feet) would be removed as a commercial product.

During density management restoration treatments, activity fuels would be created. Because hazardous fuel reduction treatments without follow-up slash treatment would only aggravate wildfire potential and behavior, activity fuels would be managed on all treatment areas to reduce subsequent fire behavior (see Activity Fuels Treatments discussion under [Connected Actions](#) for details).

Activity generated fuels resulting from thinning would be piled and allowed to cure, then would be treated in a timely manner, with the intent to reduce the fuel loading within one season of creation.

Maintenance of these treated areas would mimic historical fire return intervals and help maintain stand conditions that would be consistent with low-mixed severity, fuel limited fire regimes.

Table 2-4. Plantation commercial thin units

Unit	Acres	Treatment	Logging System
101	10	Thin and RX fire	Cable
102	10	Thin and RX fire	Cable
103	15	Thin and RX fire	Cable
104	15	Thin and RX fire	Ground based
105	20	Thin and RX fire	Cable
106	30	Thin and RX fire	Cable
107	20	Thin and RX fire	Cable
108	35	Thin and RX fire	Cable
109	20	Thin and RX fire	Cable
110	20	Thin and RX fire	Ground based/cable
111	45	Thin and RX fire	Helicopter
112	15	Thin and RX fire	Cable
113	35	Thin and RX fire	Cable
114	20	Thin and RX fire	Cable
115	5	Thin and RX fire	Cable
116	15	Thin and RX fire	Cable

Note: Unit acres are based on GIS analysis. Actual on the ground layout may vary unit size by as much as 5-10%.

Thinning With No Commercial By-product

This is a reforestation and restoration action where the objective of treatment is to control the density and species composition of immature stands. It is designed to maintain or improve growth rates and reduces undesirable levels of mortality from suppression (from larger, healthier trees), insects, and disease.

The trees that would be treated are generally less than eight inches in diameter, although trees up to ten inches in diameter may be cut. The result of this treatment usually concentrates growth in those trees with the most desirable characteristics.

During density management restoration treatments, activity fuels would be created. Because hazardous fuel reduction treatments without follow-up slash treatment would only aggravate wildfire potential and behavior, activity fuels would be managed on all treatment areas to reduce subsequent fire behavior (see Activity Fuels Treatments discussion under [Connected Actions](#) for details). Activity generated fuels resulting from thinning would be piled and allowed to cure, then would be treated in a timely manner, with the intent to reduce the loading within one season of creation.

Maintenance of these treated areas would mimic historical fire return intervals and help maintain stand conditions that would be consistent with low-mixed severity, fuel limited fire regimes.

For this treatment, there are 74 units for a total of approximately 2,560 acres (units 201 through 273).

Community and Culture

Provide protection to communities at risk from wildland fire, provide for sustainable recreation opportunities, and to improve community awareness for stewardship of the land to foster a respect for ecosystems and the processes that maintain them. To achieve this, there is a need to:

- *Reduce risk to communities and other developed areas from wildland fire.*
- *Provide sustainable recreation opportunities in response to changing demand.*
- *Minimize unauthorized recreational and other uses (OHV, camping, dumping, etc.).*
- *Promote small innovative forest products and restoration by-products.*
- *Foster collaborative approach to land management.*
- *Improve community awareness of our stewardship of the land and foster a respect for ecosystems and the processes that maintain them.*

Specific actions under this category include fuels maintenance in previously treated areas, provide for additional recreation opportunities, and restore areas impacted by unauthorized use.

C-2 Maintenance of fuels in previously treated areas using prescribed fire and small-diameter thinning

Maintenance of fuels in previously treated areas using prescribed fire and small-diameter thinning is vital to the long term effectiveness of initial treatments and investments. Included in the maintenance of previously treated areas is the footprint of the 2017 Burnt Peak Fire (see Figure 2-6).

Prescribed fire and small-diameter thinning would be used to maintain fire resilient characteristics in the burned area. Maintenance of previously treated areas would mimic historical fire return intervals and help maintain stand conditions that would be consistent with low-mixed severity, fuel limited fire regimes.

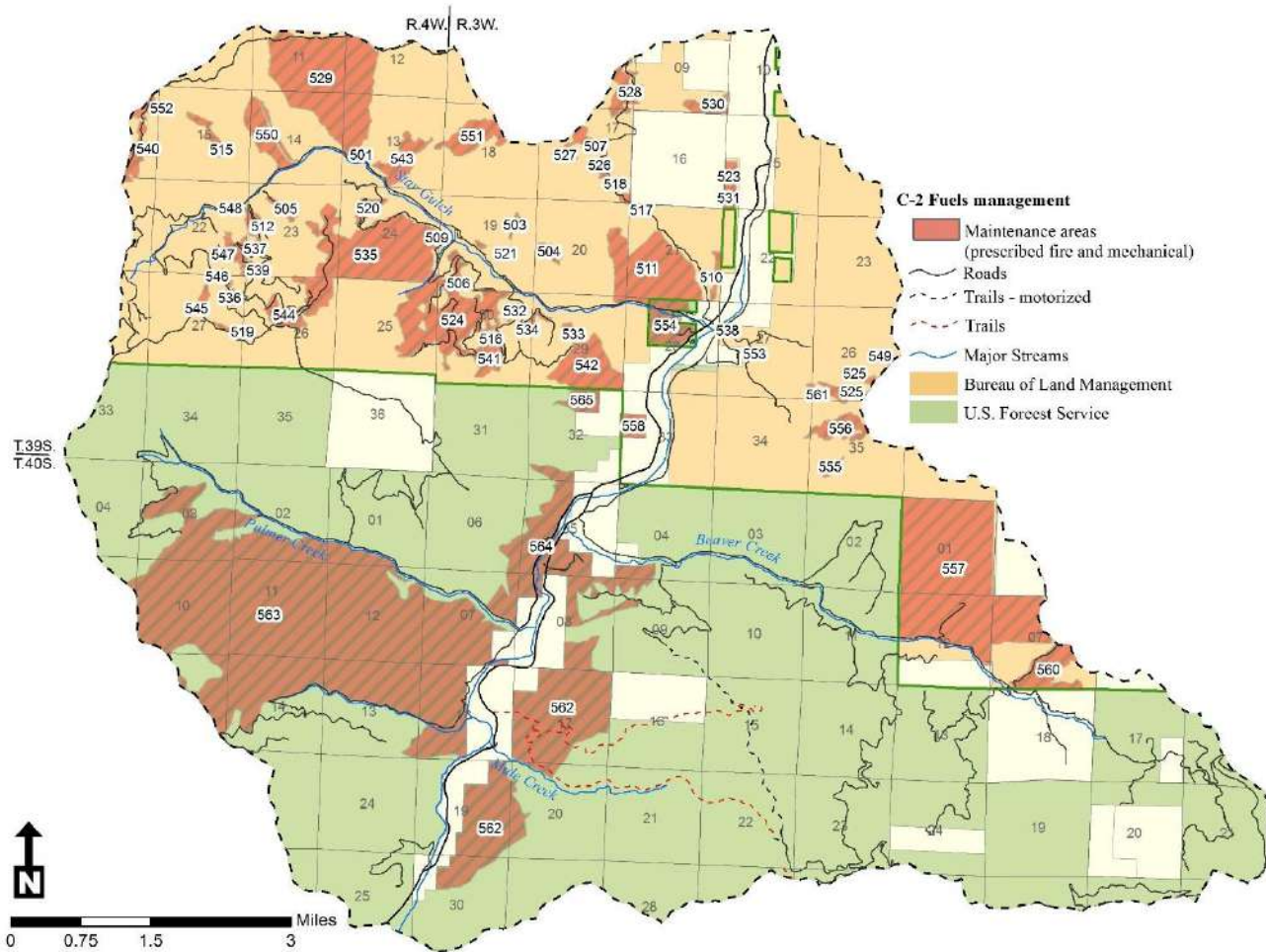
Fuels treatments would reduce wildfire hazard, risk, and negative impacts to communities, infrastructure, and landscapes. Treatments are designed to improve biodiversity, stand resilience and minimize impacts to highly valued resources including water quality and quantity, recreation use, and late-successional habitat. Participation with communities bordering federal lands in partnership with local stakeholders would reduce risks and threats from wildland fire to both federal and private lands.

Approximately 11,000-13,000 acres would be maintained.



Prescribed burning on the Siskiyou Mountains Ranger District (Photo US Forest Service)

Figure 2-6. Map of C-2 Fuels Maintenance Areas



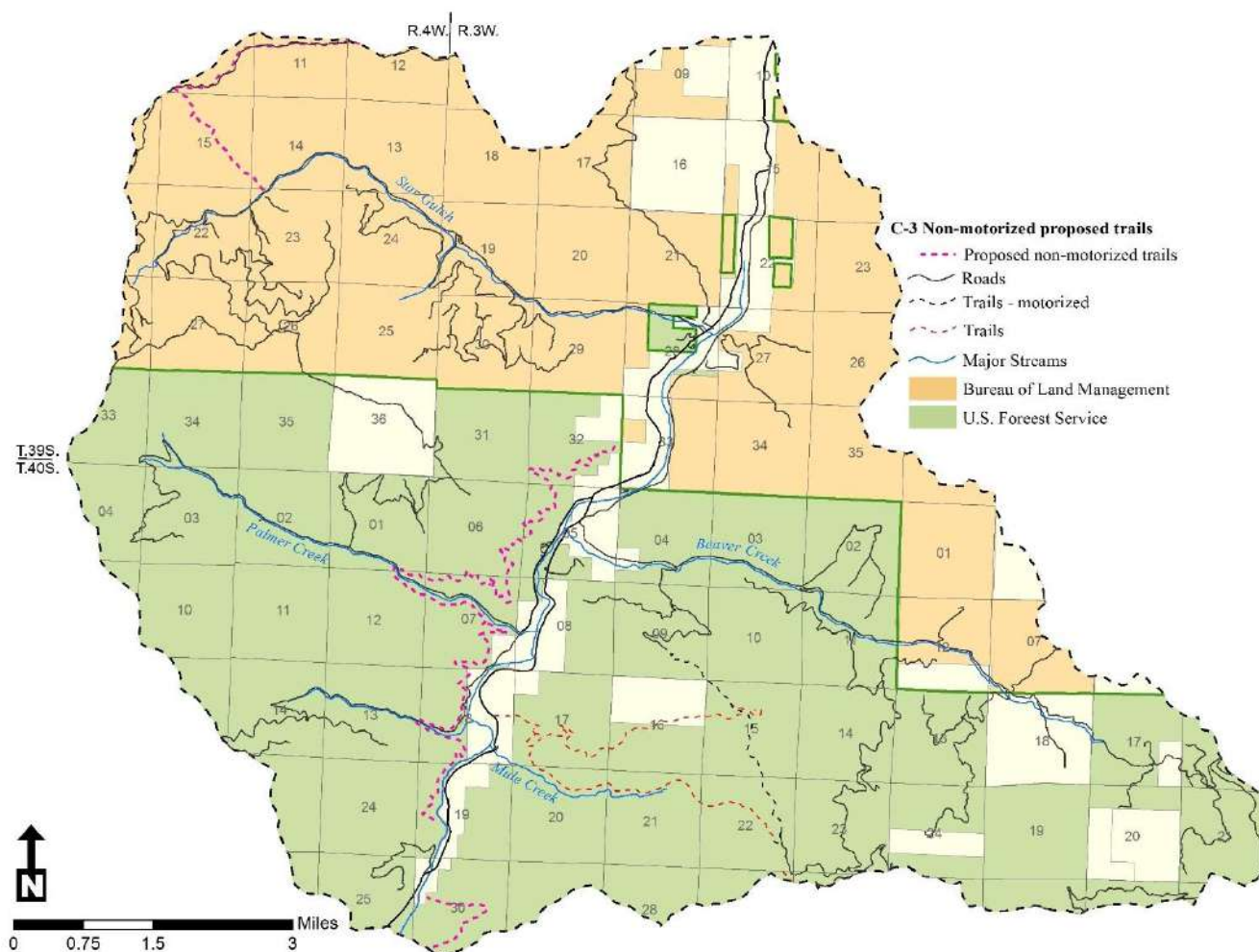
C-3 Provide additional opportunities for non-motorized recreation

This action would provide additional opportunities for non-motorized recreation by utilizing historic ditch locations or abandoned roads for trails minimizing adverse effects of new trail construction. New trail construction may be needed in some locations to connect ditches and roads or to avoid areas of resource concerns (see Figure 2-7).

New non-motorized trail designations include the “Tallowbox Trail”, the “Applegate Ditch Trail”, and the “Brushy Gulch Ditch Trail”. The Tallowbox trail would convert the existing closed Ladybug Gulch road to a non-motorized trail open to hikers and equestrians. A portion of this trail connecting to Tallowbox Mountain on an existing road would be considered mixed use. The Applegate Ditch trail would convert a series of mining ditches and existing roads to a non-motorized trail that would be open to hikers, bikers, and equestrians depending on the location and it would connect closed Forest Service Road 1010-500 to Kanaka Gulch just below Applegate Lake. The Brushy Gulch Ditch trail would convert a series of existing closed roads and a series of mining ditches to a trail open to hikers, bikers and equestrians and would eventually, under future planning efforts, connect the Brushy Gulch area with Squaw Lake.

Approximately 16-18 miles of mining ditches and roads have been identified to be converted to non-motorized trails. Trails would be maintained to Trail Class 2¹⁰- Pack and Saddle standards with an 18-48 inch tread width, 10 foot clearing height, and 6-8 foot clearing width. A maintenance strategy would be developed for existing and new trails.

Figure 2-7. Map of C-3 Proposed Non-motorized Trails



C-4 Decommission unauthorized OHV trails and restore dispersed recreation use area

This action would decommission unauthorized OHV routes to eliminate use and restore dispersed recreation use areas by blocking vehicle access. Unauthorized OHV route decommission activities would be determined by location, but could include installing waterbars in the trail tread to limit further erosion and discourage future use, covering the trail tread with locally available brush and rocks, installing signs, constructing rock or log barriers, and/or planting and seeding with appropriate vegetation. Restoring of dispersed recreation use areas would primarily be through closing locations to vehicles by installing boulder barriers and signs.

¹⁰ For National Quality Standards for trails, design parameters, and other related guidance, refer to Forest Service Manual 2353 or Forest Service Handbook 2309.18.

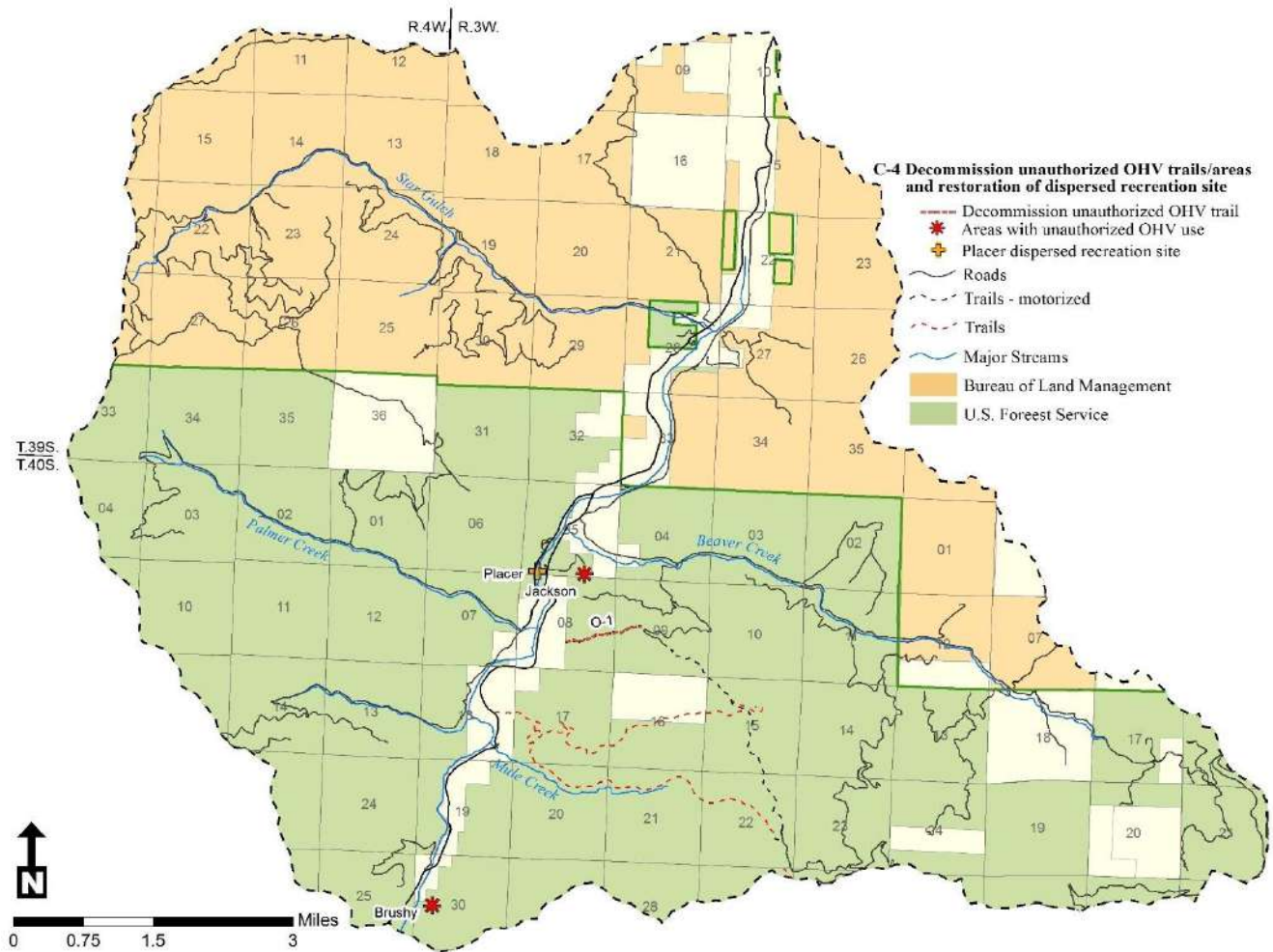
Unauthorized OHV routes that would be decommissioned include a route that extends approximately one mile from Boulder City to Forest Service Road 2000940 and several short routes located just east of Jackson Campground off an unnumbered Forest Service Road which total approximately 1.5 miles (refer to Figure 2-8)

Some unauthorized routes have been previously identified in the Brushy Gulch area, but initial field reconnaissance did not locate any unauthorized routes. Other unauthorized OHV routes that are found during the planning process would be decommissioned as well.

There are several dispersed camping areas located just south of the Placer Day Use Area that would be restored by blocking vehicle access with boulder barriers.

Approximately 3-4 miles of unauthorized routes would be decommissioned to eliminate use.

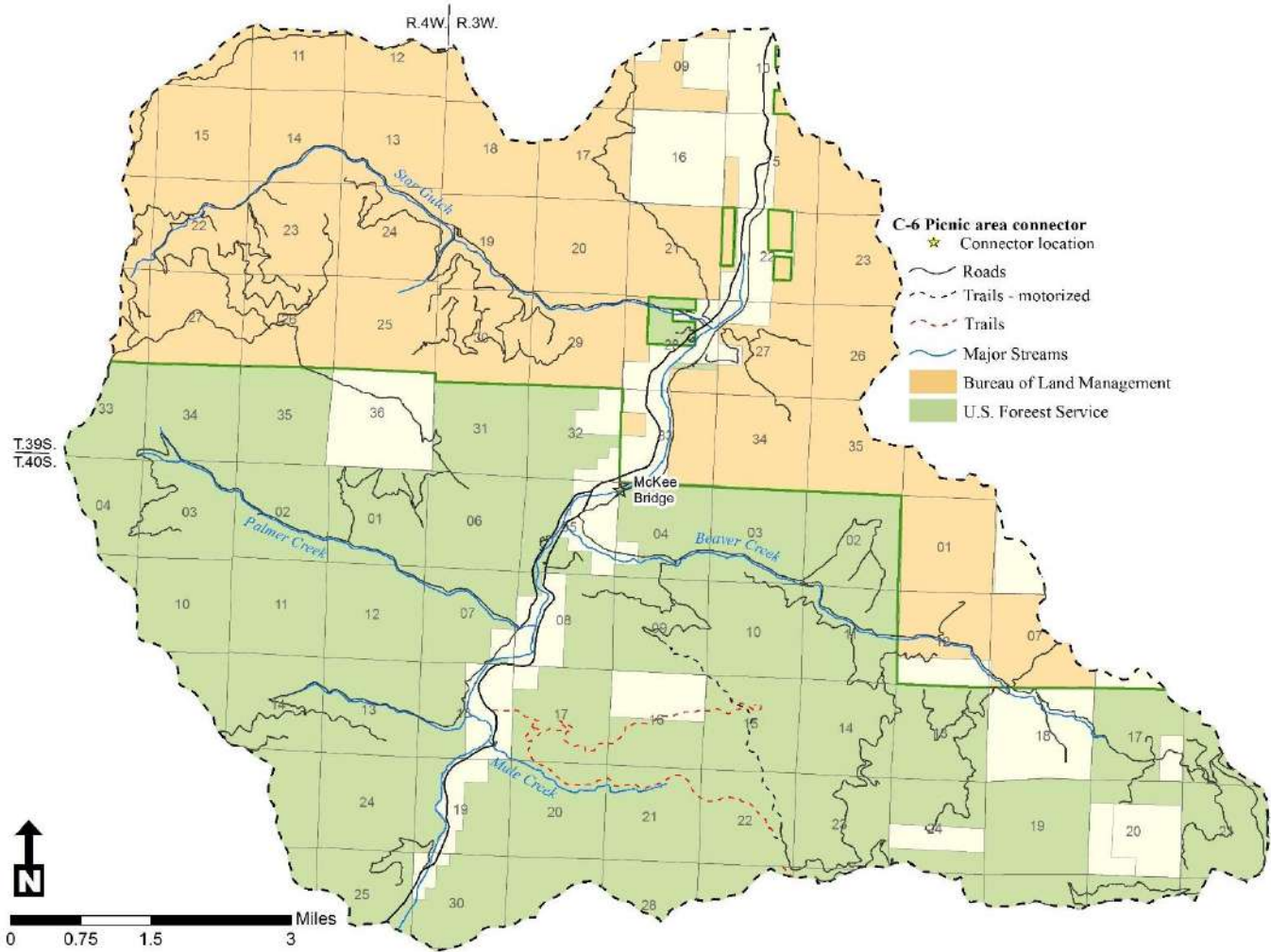
Figure 2-8. Map of C-4 Unauthorized OHV Trail Decommissioning and Dispersed Recreation Site Restoration



C-6 Restore/re-establish trail near McKee Bridge Picnic Area.

This action would re-open an old abandoned trail (approximately 300 feet long) that accesses the McKee Bridge Picnic Area with the Eastside Road. Primary work would just involve brushing and removing any debris from the trail tread. The trail would be signed and added to the Forest system of trails (see Figure 2-9).

Figure 2-9. Map of C-6 McKee Bridge Trail Restoration



C-7 Provide additional opportunities for motorized recreation

This action would provide additional opportunities for motorized recreation (Class III¹¹-single-track motorcycle) by designating existing abandoned trails and roads as being open to motorized use. New trail construction may be needed in some locations to reroute overly steep sections of existing trails or to connect road segments (approximately ½ mile).

Approximately 5½ miles of existing abandoned roads and trails would be incorporated into the motorized trail system which would provide a desirable single track experience for motorized users and provide connectivity to existing motorized routes on BLM lands north of Cinnabar Mountain and Forest Service motorized trails south of Forest Road 20 while minimizing mixed use on paved roads. Trails would be maintained to FS Trail Class 3- motorcycle standards with an 18-36 inch tread width, 6-8 foot clearing height, and 4-5 foot clearing width.

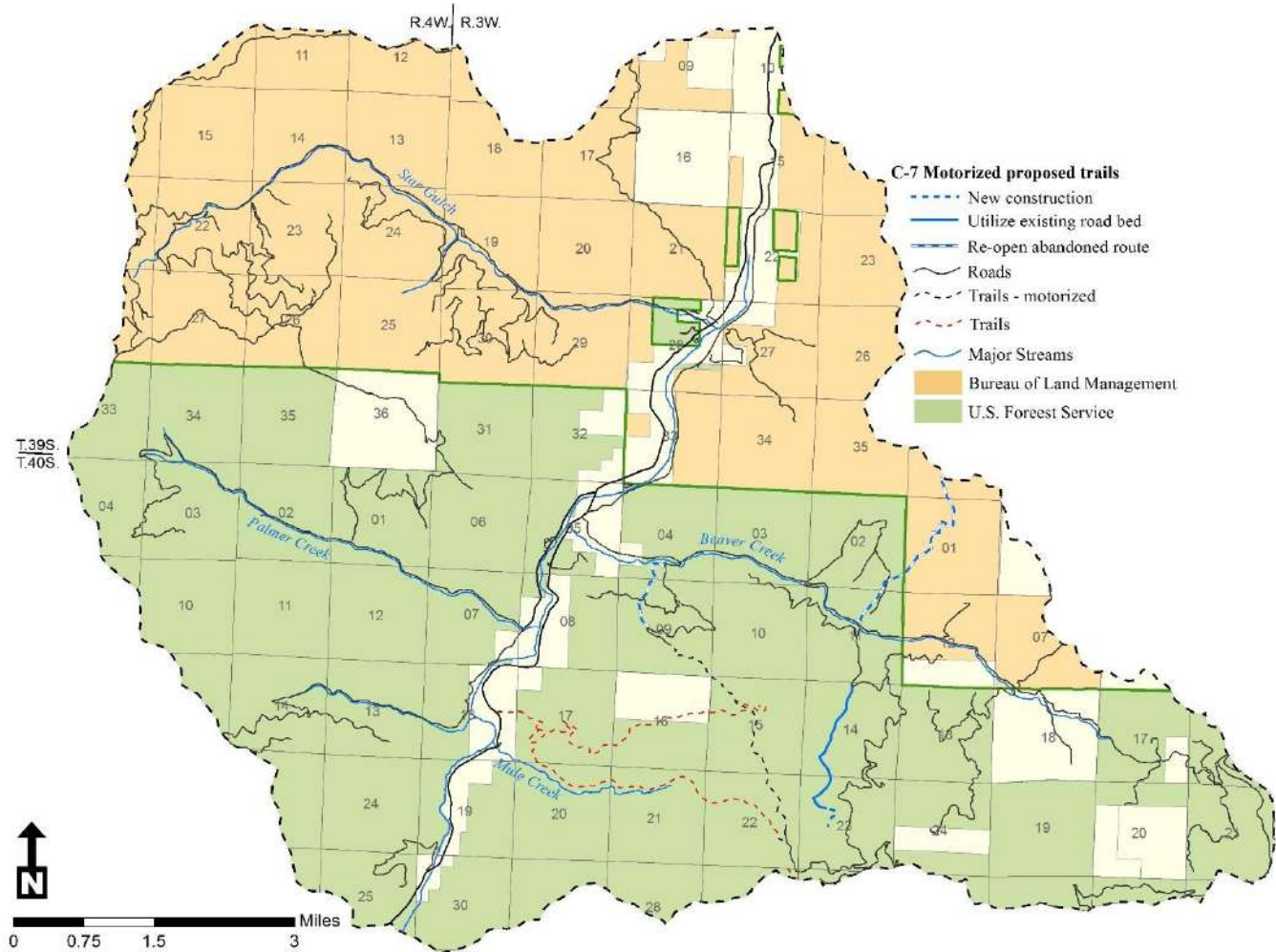
¹¹ All-terrain vehicles (ATV's) are defined by class in the Oregon Revised Statutes

New motorized recreation opportunities would include the “Cinnabar Lookout Trail” which is an existing abandoned trail that connects Forest Service Road 20 to Bureau of Land Management (BLM) road 40-2-7.1 near Cinnabar Mountain (approximately 2.5 miles), the lower or north end of the existing abandoned Charlie Buck trail (#918) (approximately 1.1 miles), and the decommissioned Forest Service Road 2010-200 road in the Hanley Gulch area would be converted to a motorized trail (approximately 1.6 miles).

New trail construction would include a reroute of two overly steep sections of the Charlie Buck trail that exceed current Forest Service design standards for motorcycle trails and a connector trail between the 2010200 road and the 2010300 road (refer to Figure 2-10).

On the decommissioned Forest Service Road 2010-200 road in Hanley Gulch, instead of the re-installation of culvert crossings, a trail bridge design for each crossing would be completed prior to implementation of this trail system. This is the best option to prevent any erosion from the use of trail reaching the creek.

Figure 2-10. Map of C-7 Proposed Motorized Trails



b. Connected Actions

In addition to the treatments described in the Proposed Action, there are additional and inherent connected actions associated with implementation. According to the *Council on Environmental Quality Regulations for Implementing the Procedural Provision of NEPA*, 40 CFR, Section 1508.25, actions are connected if they automatically trigger (or are triggered by) other actions; cannot or would not proceed unless other actions are taken previously or simultaneously; are interdependent parts of a larger action and depend on the larger action for their justification.

Harvest Methods

Within the Upper Applegate watershed, logging system options include ground-based systems and skyline cable systems. Other systems, such as aerial systems (helicopter), may be utilized provided they meet the project design criteria and project objectives.

Ground-based Systems - this refers to a group of logging methods that are considered ground-based, and may also include mechanized harvesting equipment. Typically, logs are harvested using mechanized heavy equipment to skid the logs to a landing area, where they would be loaded onto a truck. These ground-based systems are usually utilized on terrain where slopes are less than 35%.

Tractor - In this system, a cutter would fall, then limb and buck the tree where it landed when it was felled. Chokers are attached to the logs and a tractor equipped with a winch uses a “bull line” to pull the logs into a pre-designated skid trail. When a group of logs is assembled into a turn, the chokers are gathered together, the leading ends of the logs are suspended above the ground behind the tractor by way of an integral arch or similar apparatus, and the trailing end of the logs drag along the ground on the way back to the landing. At the landing, a front-end or a knuckle-boom loader is used to load logs decked at the landing onto log trucks.

Rubber-tired Skidder - This system is essentially the same as tractor logging in technique, although the skidding equipment has some operational and functional differences. While most tractors have steel tracks with cleats that run along a rigid rail and tends to churn up some soil when it turns, rubber-tired skidders are often articulated in their middle instead of a rigid frame, and they displace less topsoil than a tractor would when it turns. Both types of equipment can have advantages, depending on the situation.

Harvester – Forwarder – (also known as cut to length systems) A harvester and forwarder are two separate pieces of equipment. The harvester (while traveling on pre-designated harvester trails) reaches its boom out to cut the tree, and lays it on its side approximately perpendicular to the axis of the skid trail. Rollers on the cutting head then pull the tree through cutting knives which deposits the limbs in the skid trail as they are severed.

As each pre-determined length of log has been fed through the de-limbing knives, logs are bucked from the tree and allowed to fall into a stack of uniform length logs alongside the harvester trail. As the harvester travels through the unit, it rides on the bed of slash that acts as a cushion to help minimize soil compaction. Later, a forwarder uses the same trails to pick up the logs, load them onto its bunk, and transport the logs to the landing, completely free of the ground instead of dragging them behind the machine. Because the logs are transported free of the ground, the weight is evenly distributed over all of its wheels, so the resultant ground pressure is less than with other ground based systems. This method not only minimizes soil compaction, but it minimizes any exposure of subsoil so there is rarely any detrimental displacement or erosion.

Skyline-Cable Systems - This method for transporting logs from stumps to landings utilizes a wire rope cable that is suspended between two high points. This cable (or skyline) functions as an overhead track for a load carrying carriage. Logs are lifted by cables or other devices attached to the carriage and pulled into a skyline corridor. The carriage is then pulled to the landing by a mainline powered by a yarder. The skyline provides vertical lift so that the logs have their leading end suspended above the ground during inhaul. In some cases, the entire log may be suspended above the ground.

Aerial Systems - Heavy-lift helicopters could be used to transfer the logs from where they are cut to a landing where they are loaded on trucks for haul to a mill. Helicopters are divided into three classes, depending on their lift capabilities. Helicopters have high operating costs and are usually utilized where there are specific concerns for ground disturbance or where road building is not desired.

Temporary Roads

Temporary Roads have been defined in 36 CFR 212.1 as: “Roads authorized by contract, permit, lease, other written authorization, or emergency operation not intended to be part of the forest transportation system and not necessary for long-term resource management.” Temporary roads are generally proposed where single entry access is needed for access to harvest units.

Temporary roads typically have a lower planning, design, and initial development cost than permanent system roads. They do not add to the forest’s road maintenance costs since all costs associated with the development, use and obliteration of these roads are covered by the associated project. Temporary roads are generally shorter than system roads and are open only during use and/or the life of the project.

Temporary roads, just like any other roads, are included as part of the affected (detrimental) soil conditions under the Soil Quality Standards and Guidelines. In order to prevent continued low level casual use, and to minimize resource impacts, such roads and landings would be obliterated at the completion of their intended use.

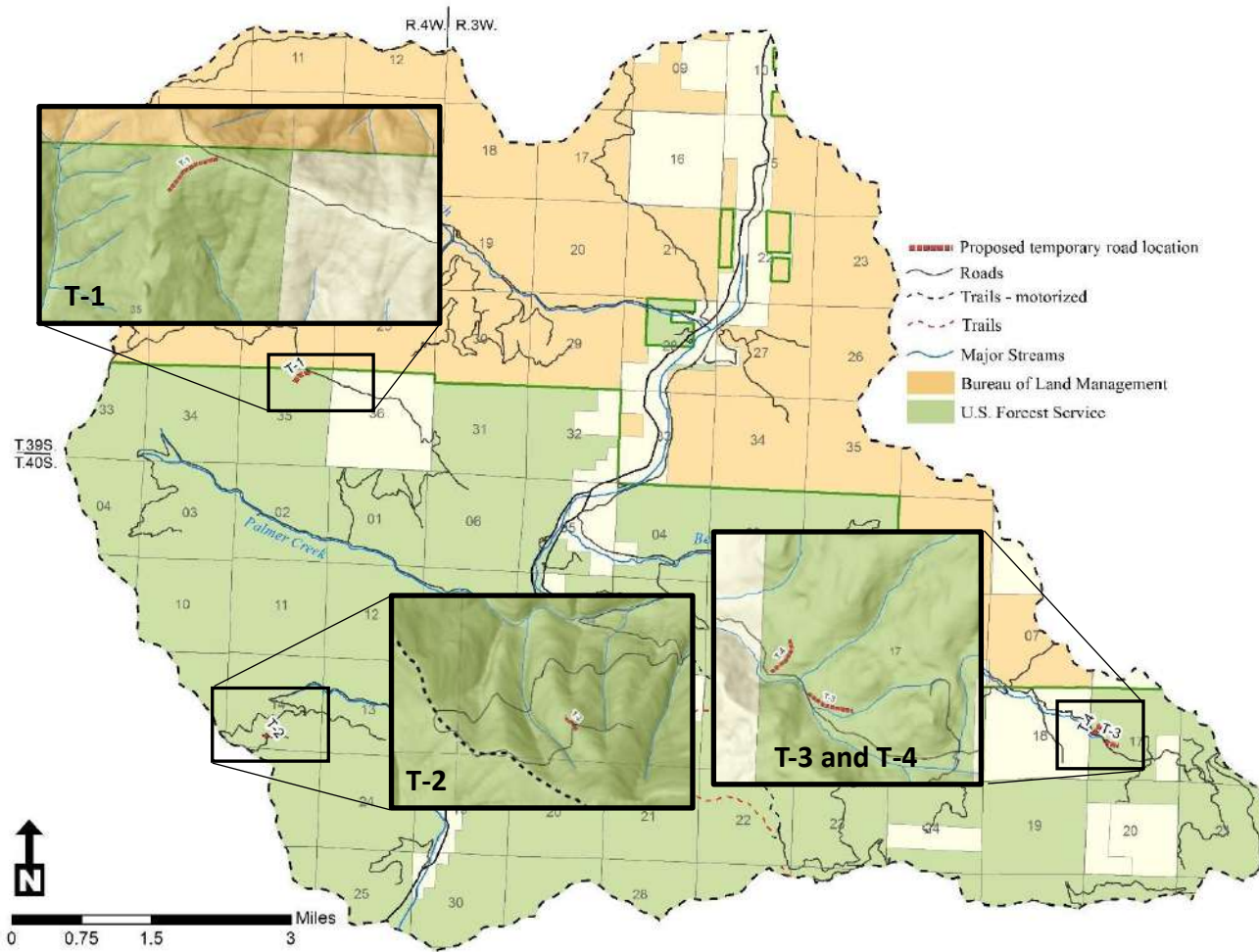
It is estimated that four temporary spurs (see Figure 2-11), totaling approximately 3,000 feet, would need to be constructed to provide access for restoration activities and to facilitate harvest systems.

Road Maintenance

Road maintenance includes travel way surface maintenance, drainage ditch maintenance, culvert cleaning, surface rock replacement, roadside brushing, shaping of the roadway and ditches by blading, removal of slough materials, compacting and other mechanized and hand work to maintain the integrity of the road facility and minimizing effects to natural resources adjacent to the road. Much of this work is done with a motor grader, dump trucks and backhoe.

Road maintenance renders the road durable and useable or in a stable condition that minimizes effects on soil, water and other resources. Maintenance work is usually performed commensurate to the use of the road and the condition of the road.

Figure 2-11. Map of Proposed Temporary Road Locations



Product Transport or Haul

This activity involves loading and transporting logs or other products on log trucks along roads associated with the Proposed Action. These roads need to be in a safe and acceptable condition for this purpose, and could require existing road reconstruction or maintenance prior to this use, as described above. Hauling may occur on all road surface types including asphalt, aggregate gravel, and native-surfaced.

Activity Fuel Treatments

During density management and legacy tree restoration treatments, activity fuels would be created. Because hazardous fuel reduction treatments without follow-up slash treatment would only aggravate wildfire potential and behavior, activity fuels would be managed on all treatment areas to reduce subsequent fire behavior. Activity generated fuels resulting from thinning would be allowed to cure, then would be treated in a timely manner, with the intent to reduce the fuel loading within one season of creation.

Activity fuel treatments would likely be any or a combination of the treatments described below:

Manual Slashing - This term applies to the cutting of dense brush or saplings to reduce fuel loadings, primarily with chainsaws or hand labor. Manual slashing aids in creating greater vertical separation between surface fuels and canopy fuels, thus reducing the risk of torching and crowning. It is typically followed by handpiling and burning. This treatment would be employed where there is generally an open canopy (less than 40% canopy closure) and would not include heavy mechanical equipment.

Lop and Scatter - This is a method of slash reduction where accumulations and concentrations are mechanically broken up (with chainsaws and hand labor) and dispersed from dense locations. This places woody material in proximity to the soil, where decomposition and soil building processes can begin. No burning is prescribed under this method.

This treatment is typically used where the slash accumulation is not expected to be heavy and risk of ignition is low. This method could be applied on unstable areas where additional ground cover is required.

Chipping - There are opportunities for chipping. A limited amount of chipping using a mechanical chipper that is towed behind a truck could be accomplished where treatments are adjacent to existing roads to dispose of small diameter material.

Chipped material could be used for erosion control along cut banks or fill slopes or could be hauled away as a miscellaneous forest product opportunity. Another opportunity is to locate a large “drum chipper” on a landing area and chip material that is hauled to the site. This method may be utilized in areas where the fuels could not be treated on site by burning or piling without causing unacceptable resource damage. Chips would then be hauled from the site. Another untested potential application is use of a portable chipper that is moved around by helicopters.

Hand Piling - This method would be used when the amount of fuels build up is too heavy to underburn without resulting in detrimental effects to the residual forest stand and soils. Concentrated areas of existing and post-treatment fuels are hand cut with chainsaws and piled into small piles, usually 3 to 6 feet in diameter.

Off-Site Removal of Fuels - An additional consideration of surface fuels treatments is the need to remove fuels from the site, typically when resulting fuel loading is very high (either naturally or created). This condition can occur if burning is not practical (because of unacceptable soil effects or burning window is too small), or when other methods are likewise impractical.

Types of burning (also see discussion of prescribed fire) that would be used in conjunction with activity fuel treatments to achieve the various fuel reduction objectives are described below:

Pile Burning - Small piles (generally 3-6 feet in diameter) of vegetation debris that are a result of hand piling, would be allowed to cure or dry to optimize consumption, and would be burned following adequate moisture accumulation to prevent escaped fire and achieve resource objectives.

Swamper Burning - Swamper burning involves hand-cutting material to be burned, starting a small fire, and continuously feeding hand cut material into the fire. The fire ring size ranges from about 4 to 10 feet in diameter, depending on the steepness of the slope. On steep slopes the fire ring can increase in size as a result of rolling debris and convection heat.

Jackpot Burning - Jackpot burning is the burning of discontinuous, concentrated areas of slash created from vegetation treatments (e.g., variable density management). Burning would typically occur following an extended period of dry weather which would allow the slash to cure for optimal consumption.

Underburning - A prescribed fire ignited under the forest canopy that focuses on the consumption of surface fuels but not the overstory vegetation. Underburning is generally used following a pre-treatment such as thinning and /or pile burning to further reduce the surface fuels, help maintain the desired vegetation conditions and enhance the overall health and resiliency of the stand. This would occur when fuel moisture, soil moisture, weather and atmospheric conditions would allow for the fire to be confined to a predetermined area.

III. Project Design Criteria

During the course of the collaborative process, the following design elements for the proposed restoration treatments were identified.

a. National Forest Riparian Reserves

Within Riparian Reserves, density management thinning treatments and/or commercial extraction should only be considered if needed to allow attainment of or to restore Aquatic Conservation Strategy (ACS) objectives. Timber harvest is prohibited in Riparian Reserves, unless it is to acquire desired vegetation characteristics needed to attain ACS objectives or to mitigate damaging effects to Riparian Reserves from catastrophic events such as fire, flooding, volcanic, wind, or insect damage (NWFP Standards and Guidelines, TM-1).

A young healthy stand has greater potential to provide shade within riparian areas and restore the timing, volume, rate, and character of sediment input and storage (water quality and aquatic habitat). A young healthy stand also has greater potential to grow into a late seral forest, providing late-successional habitat.

Overall Design Elements for Riparian Reserve Treatments

- Currently unmapped Riparian Reserves within the Upper Applegate watershed or within one site-potential tree (assumed to be 150 feet for all areas) of the watershed boundary would be identified and included in riparian reserves during marking and unit layout and prior to implementation of treatments.
- No new temporary roads or landings, gap treatments, or heavy thinning is proposed nor allowed within Riparian Reserves without prior examination by a soils scientist or hydrologist to prescribe site specific mitigation, if needed (including relocation of the road).
- No density management would occur within 25 feet of the stream channel.

As a special design element for this project, within 100 feet of a stream course, pre and post activity would not result in a loss of more than 10% of the soil infiltration capacity. This element would include existing skid trails, which could be re-utilized as necessary and then be deep ripped (as feasible) to re-establish soil infiltration capacity. The 10% figure does not include new haul roads or landings because they would be prohibited within Riparian Reserves.

To facilitate log suspension with skyline operations, corridors for cable rigging would be allowed to pass through Riparian Reserves. A maximum width of 12 feet is required and logs may be yarded through this corridor if necessary. Corridors must be spaced at a minimum of 200 feet apart if they pass through Riparian Reserves. Corridor “rub trees” would be left, even if damaged and/or felled.

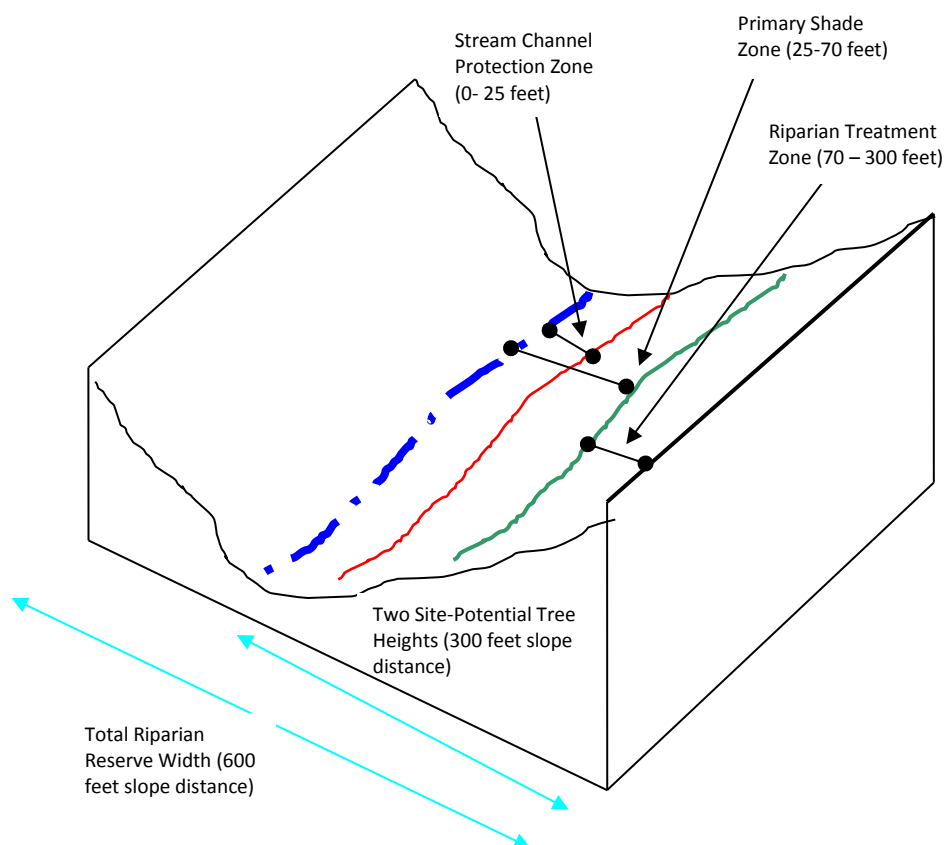
Riparian Reserve treatments and project design elements fall into three categories; (1) fish-bearing perennial streams, (2) non-fish-bearing perennial streams, and (3) intermittent/ephemeral streams, wetlands and unstable areas.

Category 1: Fish-bearing Perennial Streams

This category includes permanently flowing fish-bearing streams. The primary concern regarding treatments within this category is maintenance of stream temperature. Project design would follow direction provided in NWFP Temperature Total Maximum Daily Load (TMDL) Implementation Strategies 2012¹². This involves protection and maintenance of existing stream shade, and maintenance of the existing micro-climate, ambient air temperature, and air movement. For this Category, Riparian Reserve widths are two site potential tree heights each side of stream course (150 feet times 2 = 300 feet each side; total width 600 feet).

The Stream Channel Protection Zone is from the edge of stream course up to 25 feet. No vegetation management (including commercial extraction) would occur within 25 feet of the active stream channel. No hand piles would be located or burned within the channel. Prescribed fire would not be ignited within this zone but fire may be allowed to “back down” to the stream channel.

Figure 2-12. Riparian Reserve Design Elements – Category 1 Fish Bearing Perennial Streams



The Primary Shade Zone is an area where no commercial extraction would occur (larger trees felled for skyline corridor clearing would be left), however some density management, fuels reduction or other restoration treatments could occur. Distance from active stream channel varies according to height of existing overstory trees and hill slope in immediate area.

¹² This document is an evaluation of the Northwest Forest Plan Aquatic Conservation Strategy and Associated Tools to achieve and maintain stream temperature water quality standards. USFS and BLM; Final version 2012.

For managed stands trees that provide shade are assumed to be 60 feet and greater. The following table establishes the width of the Primary Shade Zone.

Table 2-5. Minimum Width of Primary Shade Zone (feet), based on slope and Tree Height

Height of Tree	Hill slope < 30%	Hill slope 30% to 60%	Hill slope > 60%
Trees < 20 feet	12 feet	14 feet	15 feet
Trees 20 to 60 feet	28 feet	33 feet	55 feet
Trees > 60 to 100 feet	50 feet	55 feet	60 feet
Trees > 100 to 140 feet	70 feet ¹	75 feet	85 feet

¹For the hydrology NEPA analysis 70 feet is selected for the project wide primary shade zone (for perennial streams only).

The Temperature Implementation Strategies allow the distances in Table 2-5 to be less (but not less than 25 feet) if any of the following conditions applies:

- The trees are located on a south facing slope (175-185 degree azimuth) and therefore do not provide stream shade;
- An appropriate level of analysis is completed and documented, such as shade modeling, using site-specific characteristics to determine the primary shade tree width; and or
- Field monitoring or measurements are completed to determine the width where optimum Angular Canopy Density (65% or greater) is achieved.

The Riparian Treatment Zone (or Secondary Shade Zone) includes the area from the edge of the Primary Shade Zone to the outer edge of the Riparian Reserve. Density management treatments and commercial extraction would be allowed, following guidelines and overall design elements for Riparian Reserve.

Within the Riparian Treatment Zone, the primary concern is prevention of sediment delivery to streams, prevention of concentrated overland flow, and maintenance of infiltration rates. The maximum percent of area for detrimental soil conditions under the LRMP is 10% for an activity area (LRMP S&G). This standard includes roads and landings. The 10 % soil infiltration capacity standard also applies, as noted above.

Category 2: Non Fish-bearing Perennial Streams

This category includes permanently flowing non fish-bearing streams. The primary concern regarding treatments within this category also is maintenance of stream temperature. Project design would also follow direction provided in NWFP Temperature TMDL Implementation Strategies 2012. This involves protection and maintenance of existing stream shade, and maintenance of the existing micro-climate, ambient air temperature, and air movement.

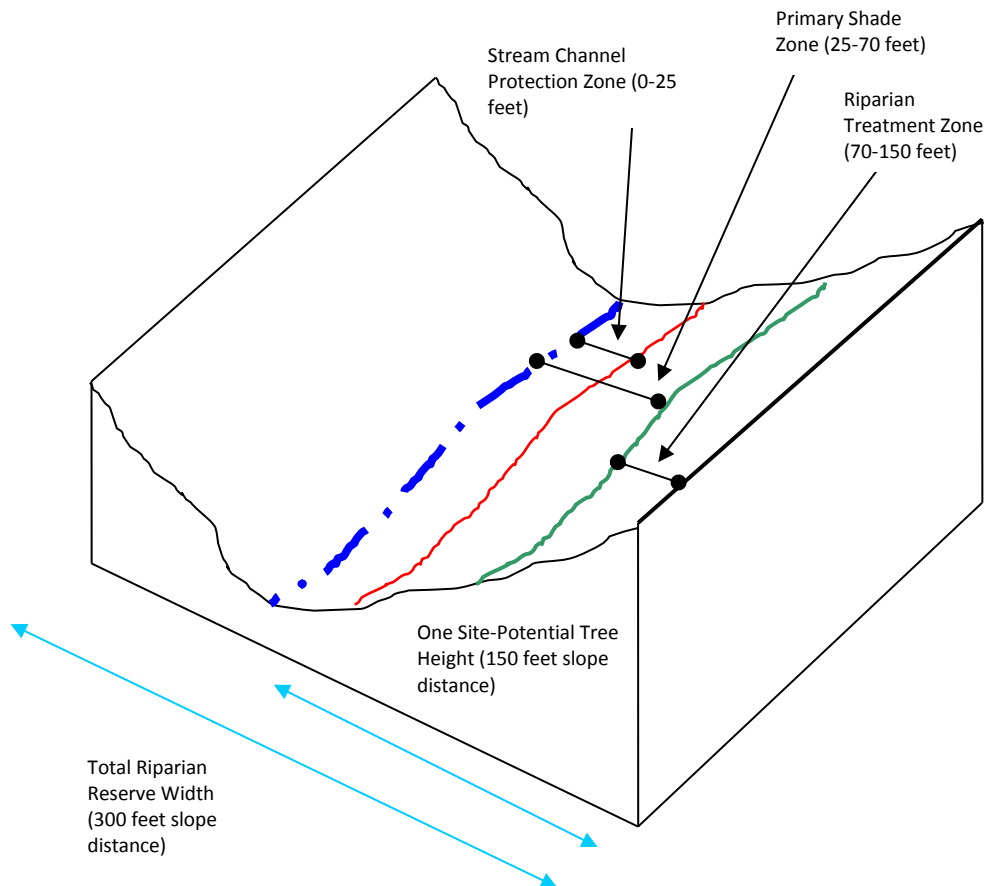
For this Category, Riparian Reserve widths are one site potential tree height each side of stream course (150 feet each side; total width 300 feet).

The Stream Channel Protection Zone is from the edge of stream course up to 25 feet. No vegetation management (including commercial extraction) would occur within 25 feet of the active stream channel. No hand piles would be located or burned within the channel. Prescribed fire would not be ignited within this zone but fire may be allowed to “back down” to stream channel.

Under Category 2, the Primary Shade Zone is also an area where no commercial extraction would occur (larger trees felled for skyline corridor clearing would be left), however some density management or other restoration treatments could occur. Distance from active stream channel varies according to height of existing overstory trees and hill slope in immediate area.

Table 2-5 establishes the width of the Primary Shade Zone. The Temperature Implementation Strategies (discussed above) also allow the distances in above table to be less (but not less than 25 feet) under the same conditions as under Category 1.

Figure 2-13. Riparian Reserve Design Elements - Category 2 Perennial Non Fish-Bearing Stream



The Riparian Treatment Zone (Secondary Shade Zone) includes area from the edge of the Primary Shade Zone to the outer edge of the Riparian Reserve. Density management treatments and commercial extraction would be allowed, following guidelines and overall design elements for Riparian Reserve. The primary difference between Category 1 and 2 is the width of the entire Riparian Reserve (which is differentiated by fish-bearing status).

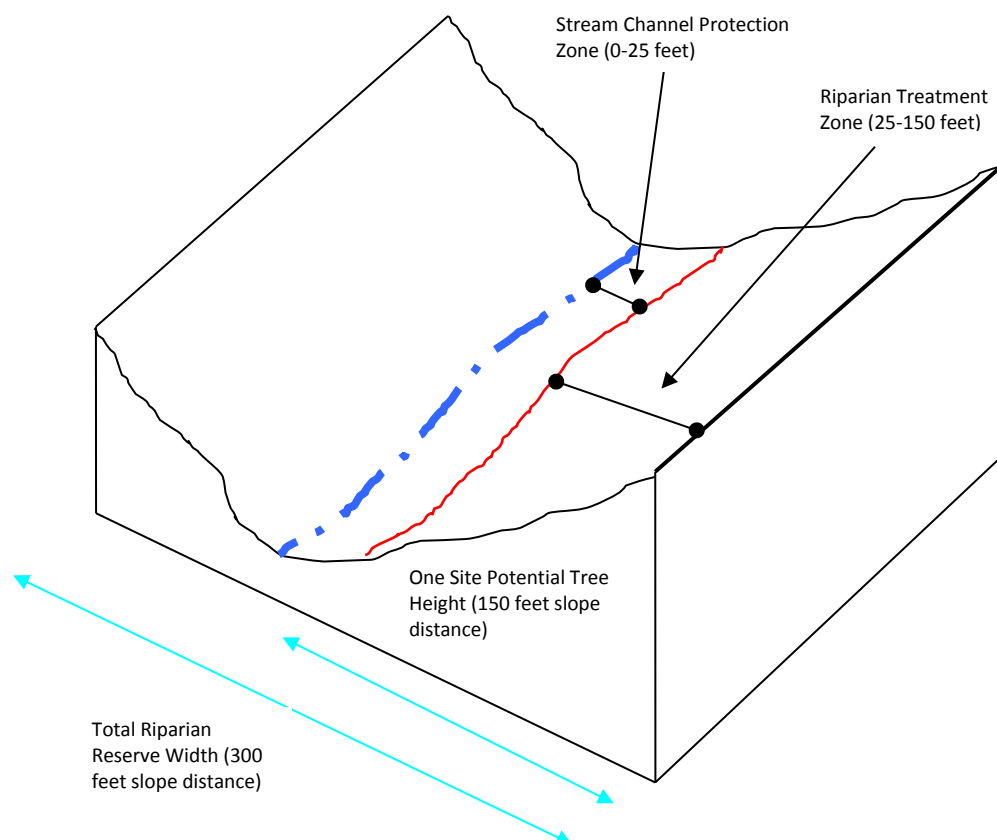
Category 3: Non Fish-bearing Intermittent/Ephemeral Streams and Wetlands

This category includes intermittent non-fish-bearing streams, wetlands greater than one acre and unstable areas not associated with perennial streams. The primary concern is prevention of sediment delivery to streams, prevention of concentrated overland flow, and maintenance of micro-climates, ambient air temperature and humidity.

The Stream Channel Protection Zone is from the edge of stream course up to 25 feet. No vegetation management (including commercial extraction) would occur within 25 feet of the active stream channel. No hand piles would be located or burned within the channel. Prescribed fire would not be ignited within this zone but fire may be allowed to “back down” to stream channel.

The Riparian Treatment Zone includes area from the edge of the Stream Channel Protection Zone, to the outer edge of the Riparian Reserve (one site potential tree height). Density management treatments and commercial extraction would be allowed, following guidelines and design elements for Riparian Reserve.

Figure 2-14. Riparian Reserve Design Elements – Category 3 Intermittent and Ephemeral Drainages, Wetlands and Unstable Areas

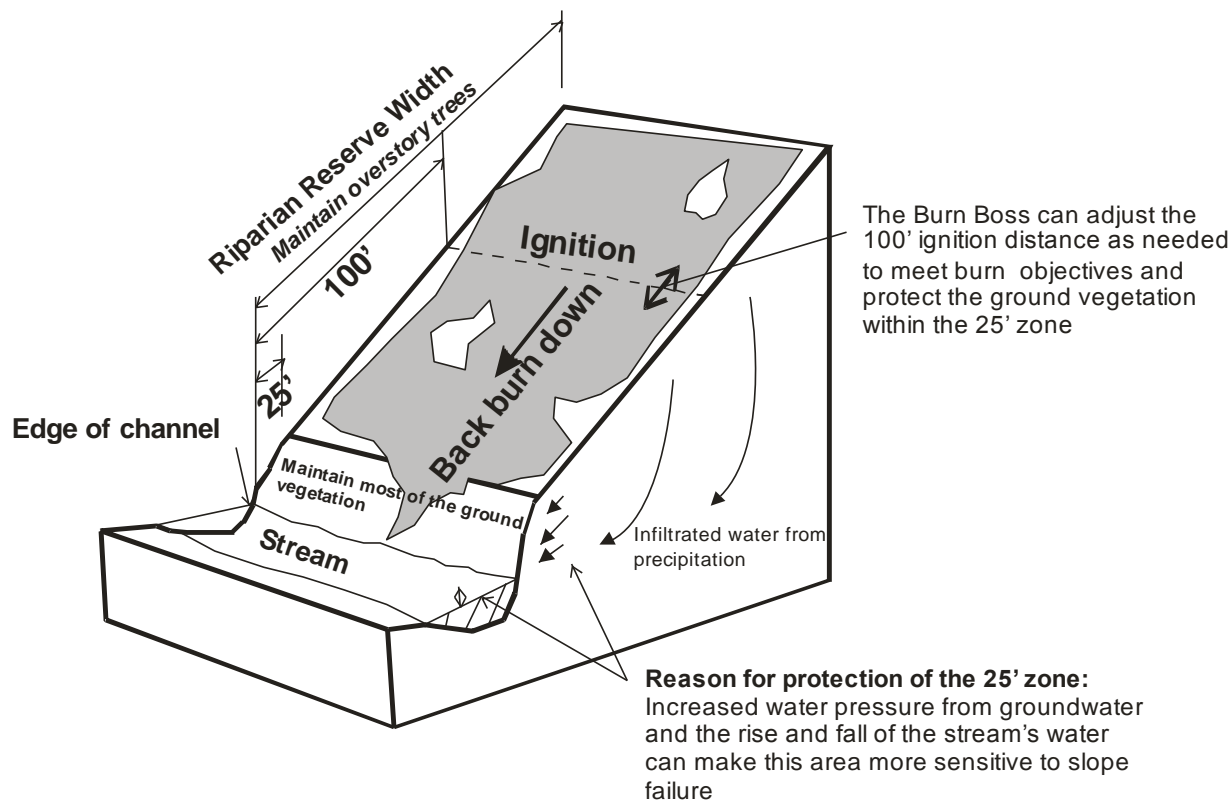


Prescribed Burning in Riparian Reserves

Prescribed burning can take place in Riparian Reserves throughout the project area. Prescribed fire activity in Riparian Reserves should be implemented under conditions that would allow for reduced fire activity to back naturally into riparian vegetation. The intention for allowing fire to back into the riparian area from a designated distance would be for preserving coarse woody material, forest canopy for shade and surface vegetation to limit any impacts to surface erosion directly adjacent to the stream.

Buffers include an adjustable range set by the burn boss based on site specific conditions of fifty to one hundred feet with fifty feet being the minimum distance direct ignition will occur. In addition to underburning constraints, no piles will be burned within twenty-five feet of the stream (See Figure 2-15).

Figure 2-15. Prescribed Burning in Riparian Reserve Design Elements



Reducing high fuel Loading - Use mechanical treatment and pile burning as needed prior to under burning to protect the overstory trees. Pile and burning should be no closer to the stream than 25' to maintain ground vegetation.

Pump chances - Fire, engineering and aquatic resource personnel will work together to determine suitable pump chances and the measures needed for the protection of aquatic resources. Refuel 100' feet from a stream or use measures to assure fuel does not reach flowing water. Water withdrawal equipment must have a 3/32 intake screen in order to avoid fish entrapment.

b. Coarse Woody Material (Snags and Down Wood)

Coarse woody material (CWM) fulfills a number of important ecological functions such as stabilizing surface soils, increasing organic content in soils over the long-term, providing habitat for the many organisms that depend on snags and down logs in various stages of decay, and ensuring adequate coarse woody material recruitment to meet the ecological needs of aquatic systems over time. CWM also moderates temperature and moisture extremes and provides a seed bed for some plant species.

Past management has changed the recruitment and accumulation of snags and down logs. Mortality salvage immediately changed the forest structure by removing snags and subsequently changed the recruitment and accumulation of down logs.

Fires play a key role in mediating the recruitment, accumulation and reduction of snags and down logs. With fire suppression and longer interval between fires, the recruitment, size, composition and processes associated with coarse woody material changes. At the same time, with increased density in stands, mortality resulting from drought stress, insects, and disease is increasing by an order of magnitude. How these conflicting impacts have changed the dynamics of coarse woody material is incompletely understood.

Therefore, the Proposed Action relies on the assumption that all snags and down logs serve important ecological roles. The general overall strategy under the Proposed Action is to conserve snags and down wood by retaining them on site. When specific management considerations (such as proximity to fire suppression lines, fire management safety, application of prescribed fire, urban interface, and the potential for insect outbreak) trigger a site-specific need to reduce coarse woody material, the material may be removed, provided worker safety and the ecological needs for coarse woody material have been satisfied.

Snags

Large snags over 21 inches diameter are particularly essential for forest function. In addition, at least 96 wildlife species in Oregon and Washington are associated with snags in forests, using snags for shelter, roosting and hunting. Most species use snags greater than 14 inches diameter. Ridges, upper thirds of slopes, and riparian areas or lower thirds of slopes are very important for late-successional dependent species. Clusters of snags are especially important. In riparian areas and upslope areas prone to landslide, snags of all size classes contribute the large woody material that is critical to creation and maintenance of stream structure and function. Snags in various size classes also are important to the recruitment of down coarse materials important to soils.

Under the Proposed Action, snag levels would be determined during implementation to identify where snags are deficient. In such circumstances, trees otherwise identified for removal may be retained as snags in lieu of removal. Largest diameter trees not selected for retention would be considered highest priority for snag creation/retention. Snag creation can also include blasting the tops, girdling, inoculation with fungi, or leaving trees with heavy mistletoe.

If snags are determined to be in excess of the targeted maximums, they may be felled to meet down wood or other objectives first, then subject to evaluation for removal as hazardous fuel. Snag levels on lower slopes would be retained within the upper one third of the range for snags for that Plant Association Group. Greater retention on lower slopes would help offset reductions required in areas that are a high priority from a wildfire management perspective, such as ridge tops and other strategic locations.

Along ridges and upper slopes, snag levels would be retained at current levels (i.e., no additional snags would be created) unless their retention would create a wildfire management hazard. Snags that increase fire hazard would be felled and left on site unless that, in turn, increases wildfire hazard. Snags should be retained as high as possible on slopes. Snags that extend above the primary canopy, but do not extend above the level of the ridgeline would be priority for retention. Areas around clusters of three or more snags are a priority for understory vegetation slashing and pruning. Activity fuels would be hand piled and burned to reduce the potential for ignition around snag clusters.

Down Wood

As with snags, down logs are important for wildlife and aquatic ecosystem function. In addition, large coarse woody material is particularly important to maintaining and holding soils in place throughout the Upper Applegate watershed. Consistent with retention goals for snags, down coarse wood would be retained to support forest function.

Under the Proposed Action, down logs are to be retained and are considered excess only when all site considerations have met and in accordance with Forest Plan Standards and Guidelines.

In general, the Proposed Action would maintain coarse woody material within the upper one third of the range for down logs for that Plant Association Group (PAG), with more logs retained in riparian areas and on northerly aspects than on southerly slopes. Where standing green trees are felled to meet habitat objectives, felled trees would be left in place as needed to meet coarse wood and/or soil objectives.

A key element of desired conditions for PAGs is down dead woody material. Desired levels of dead wood per acre are shown below for each PAG. These figures were derived from Ecology Plot data, adjusted by past conditions established by PAGs, with consideration of the DecAID¹³ advisory system.

Table 2-6. Target Coarse Woody Material Levels (number of pieces)

Plant Association Group	Diameter Class		
	< 10"	10"-19.9"	>20"
Dry Douglas-fir (1407)	54 - 93	0 - 7	0 - 9
Moist Douglas-fir (1408)	54 - 122	0 - 7	0 - 9
Dry White Fir (2004)	0 - 94	0 - 7	0 - 9
Moist White Fir (2003)	0 - 67	0 - 12	0 - 11
Cool White Fir (2098) and Moist Mountain Hemlock (2301)	0 - 69	0 - 11	0 - 11
Cool Mountain Hemlock (2311)	0 - 35	10 - 33	0 - 11

Note: A "piece" is defined as 20 feet long.

c. Hardwoods

Unlike many past and typical forest management projects that tend to encourage conifers, the Proposed Action intends to more broadly promote ecosystem functioning. Hardwoods are a critical part of the species mix and may require non-traditional practices to maintain their roles in ecosystem function and resiliency. Hardwoods are particularly important structural features for wildlife habitat.

Hardwoods are also encouraged, especially deciduous hardwoods such as Oregon white oak and California black oak, because they are less prone to crown fires than are conifers. They help to reduce the overall potential for crown fire while allowing for a greater canopy cover. Since hardwoods have the ability to sprout and hold soil after fire, areas with soil conservation concerns (e.g., landslide hazard zones) are places where hardwoods should be encouraged.

Oregon white oak, California black oak, Pacific madrone, canyon live oak, and golden chinquapin are the primary hardwoods in the watershed, and larger individuals of these species (16 inches diameter and greater) are high priorities for retention and promotion. Special efforts to maintain hardwoods in developing stands are an important part of the Proposed Action. Thinning around these remnant hardwoods is designed to increase their vigor, particularly since they tend to be shade-intolerant and easily overtopped by younger developing conifers in many situations. Removal of conifers from around preferred hardwoods should be dependent on the ability to remove them without damaging the preferred hardwood.

Hardwoods of all species are particularly important components of stands and vegetation on more southerly to westerly aspects in the Upper Applegate watershed, while Pacific madrone is important on more northerly aspects on lower and mid elevations.

¹³ DecAID is a decayed wood advisory tool for Washington and Oregon forests (Marcot et al., PNW Research Note 2002). The title can be read as decayed wood advisor and management aid "decay-aid" or "decision-aid."

d. Botanical Resources

Agency botanists, contract botanists, and other knowledgeable professional and amateur botanists have visited many portions of the Upper Applegate watershed over several decades. The surveys conducted for this planning effort resulted in the rediscovery of most of the historical populations as well as the discovery of many new populations. The following Project Design Criteria (PDC) would be implemented as part of this project in order to maintain the ecological integrity and population viability within one known Endangered *Fritillaria gentneri* population and within 28 Sensitive plant species populations that occur within proposed treatments in the UAWRP.

Botanical Surveys

In activity units or portions thereof where botanical resource surveys have not yet taken place, or require renewed surveys according to standard agency protocols as determined by the agency botanist, surveys for ESA-listed and Bureau Sensitive botanical species shall take place prior to implementing actions that could result in habitat modification or disturbance for those species. It is necessary that the agency botanist be advised which units are scheduled for treatment by February 4 of the calendar year prior to planned implementation, so that necessary surveys may be carried out at the proper time.

Special status botanical species not specifically analyzed by this project's Environmental Assessment that are discovered within project units or areas potentially affected by project activities would require review and documentation by an agency botanist to determine whether further environmental analysis and disclosure may be required.

For special status botanical species specifically analyzed in this Environmental Assessment, project design criteria applicable to known occurrences of those species may be extended and adapted to newly discovered occurrences of special status botanical species within activity units.

Wetland Botanical Habitats

Perennial wetlands (with or without clearly defined stream channels) would be managed under the Proposed Action in the same manner as perennial streams, in order to maintain habitat for the rich bryophyte and vascular plant communities that occur in these wetlands.

Protection Buffers

Listed Species (*Fritillaria gentneri*):

Overhead canopy shall be maintained within a 50 foot radius of *Fritillaria gentneri* plants.

The use of heavy equipment is not permitted within a 100-foot radius protection buffer surrounding *Fritillaria gentneri* sites, regardless of season. However, pick-up trucks, ATVs, UTVs, and similar soft-wheeled vehicles may be permitted on a plant site on a limited basis in dry conditions in the dormant season, if authorized by an agency botanist.

A leave area (skip or buffer) would be delineated around the one known population of *Fritillaria gentneri* that was found within the prescribed fire unit along Beaver Creek Road. The buffer (to protect the population) would be determined by the District and Forest Botanist during layout of the burn unit. The leave area would consider topography, aspect, canopy cover and other site specific variables such as understory shrub density and cover. It is particularly important to maintain shrubs and other vegetation directly adjacent to flowering *F. gentneri* because they provide a shield from browsing ungulates.

The overall objective of this project design criteria is to avoid direct or indirect impacts to individual flowering plants and populations. Fritillaria Management Areas (FMA's) are being designated as part of a partnership with the US Fish & Wildlife Service. Prescriptions within habitat would follow guidelines set forth in the FMA plan currently in development. The FMA plan will set forth parameters and guidelines for how to conduct fuels management work in habitat for *F. gentneri*.

Sensitive Species:

Leave areas (or skips) or special management areas would be delineated around Sensitive and Survey and Manage plant populations.

Piling slash, burning piles, or the use of heavy equipment shall not take place within *Rafinesquia californica* sites. Where necessary, the project administrator must request the botanist to flag *R. californica* sites to avoid piling within them. All other project activities may take place within these sites.

Cryptantha milo-bakeri, *Delphinium nudicaule*, *Keckiella lemmonii*, *Rhamnus ilicifolia*, and *Solanum parishii* sites shall be buffered from project activities with a 25-foot radius buffer. Vegetation may be cut within these buffers, but no pile burning or use of heavy equipment may occur within them.

Within flagged boundaries surrounding known occurrences of *Toxicoscordion exaltatum*, in order to avoid crushing or exposing subterranean bulbs, no heavy mechanical equipment is to be permitted, and no heavy trees (i.e., greater than 8 in. DBH) or other similarly heavy objects may be dropped into or dragged through the flagged areas. Brush and small-diameter tree thinning, however, is permitted if done by hand. Activity slash is to be removed from within the flagged area. As with other species, fuel piles are not permitted within the flagged boundaries.

Overhead canopy shall be maintained within a 50-foot radius of *Cypripedium fasciculatum* plants. Within the 50-foot buffer, a 10-foot radius no-activity buffer may be made around the plants to allow smaller material (conifers/brush) to be cut within the 50-foot buffer but outside the 10 foot buffer and removed outside the 50-foot buffer. *C. fasciculatum* sites would receive no entry buffers to avoid disturbance. In order to implement adaptive management an exception to this rule may be made within one or two populations so that fire effects can be monitored. Some of the Sensitive plants found in the project area would benefit from reintroduction of low severity fire into their habitat. These species would require site specific prescriptions (by a botanist) that would strategically protect individual plants while allowing for fire to be backed into the occupied habitat. The objective for *C. fasciculatum* is to avoid direct or indirect effects. The objective for other fire dependent/adapted species is to avoid inadvertent loss of the population while allowing for habitat improvement.

Unique Plant Communities

Assemblages of diverse forb and grass species make up large portions of the Upper Applegate watershed. These areas are susceptible to post disturbance compositional shifts that may result in simplification of the ecosystem. Native seeding and planting is proposed to abate this potential. Site specific prescriptions would be developed in certain priority areas. Adaptive and collaborative principles would be used to work with the community to develop the priority areas.

Invasive Non-native Species

Vehicle and equipment shall be washed prior to entering the Upper Applegate watershed after any use in other areas with potential for supporting invasive non-native species.

On Forest Service lands, post-treatment monitoring is required to detect the spread of existing or invasion of new invasive non-native species populations. A spreading or a new population would be treated so it can be controlled or eliminated. Any areas authorized for hazardous fuel reduction treatments would be surveyed for invasive non-native species and other invasive non-native plants during the second summer after activity occurs. If invasive non-native species are detected, appropriate action would be taken, in accordance with the Forest Weed Management Plan.

On lands administered by BLM, post-treatment monitoring shall take place during the spring or summer after completion of activities in any oak, pine, hardwood, or pollinator and sensitive plant improvement unit, or in special status botanical sites within fuels maintenance units, in order to prevent invasive plant establishment. Treatments of detected infestations may take place in accord with the Integrated Invasive Plant Management for the Medford District Revised Environmental Assessment (2018).

In areas prone to weed invasion, a seed mix of native species may be sown where ground disturbance occurs during management activities and/or weed-free mulch may be used to stabilize soil. Seed prescriptions would be made or approved by the appropriate agency botanist.

When determined necessary by an agency botanist, operators may be required to wash their equipment before moving from one portion of the Upper Applegate watershed to another. The need for this action as well as the recommended location of wash stations would be determined prior to project implementation.

e. Douglas-fir Dwarf Mistletoe

Management of Douglas-fir infected with dwarf mistletoe is complicated by its inherent tendency to both promote important late-successional values (e.g., spotted owl nesting sites) while exacerbating processes (e.g., increased wildland fire severity) and/or successional trends (species composition change) that can detract from project goals. The complicated nature of Douglas-fir dwarf mistletoe management, particularly given the multiple and sometimes conflicting goals of the project, necessitates decision-making on a site-by-site basis during the implementation phase.

Several features of dwarf mistletoe can be used to develop successful management practices that may promote goals outlined for the project. First, mistletoe is an obligate parasite that requires a living host to survive. Second, it is generally confined to a single host species. Third, dwarf mistletoe has a long life cycle and generally slow rates of spread. Fourth, dispersal of dwarf mistletoe seed is generally limited to short distances, typically about 10 feet. And fifth, dwarf mistletoe infected trees usually are easy to visually detect.

Douglas-fir dwarf mistletoe management practices under the Proposed Action include:

- Retaining non-host tree or shrub species between infected and uninfected Douglas-fir trees to prevent or slow spread of the parasite.
- Selecting infected trees for removal in thinning of younger, lightly-infected stands.
- Pruning infected branches, although seldom effective in eliminating the disease due to latent infections, can diminish parasite abundance while raising crown base heights to address fire hazard. This is particularly effective in vigorous trees and stands with low levels of infection.
- Clumping the distribution of infected trees into small groups widely separated from each other, thereby reducing spread.
- Cutting heavily-infected trees that can easily facilitate the movement of fire from the ground surface into tree crowns, particularly in stands that have other large trees of preferred species in proximity. Thinning around vigorous, lightly infected trees also can promote long-term availability of wildlife nesting trees. Infected trees with branches able to support large brooms are particularly important features to retain for potential spotted owl nest sites.

f. Large Tree Retention

The Proposed Action is designed to promote and maximize retention of legacy trees throughout the Upper Applegate watershed. Around legacy trees, stand density reduction would be employed in areas identified for treatment to improve vigor, reduce susceptibility to attack from bark beetles and/or disease, and reduce the potential for damage from wildfire and/or prescribed fire - that is, to maximize their potential for long-term retention. Stand density reduction would focus on smaller diameter trees first.

Where density management is necessary, thinning would start first with the smallest trees on the site. Conversely, the largest trees on the site would be reserved first. Trees identified for thinning would be used to satisfy snag and down wood targets (largest first). Density and spacing of trees left after stand density reduction can be ordered, clumped, or variable, ideally with vegetation and tree felling and removal greatest in downhill directions (or in the direction of expected spread in a wildfire event). Ladder fuels within the crown radius of the preferred legacy trees are also a priority for removal. In the treatment area around the preferred legacy trees, retention of the most vigorous trees is desired to reach the prescribed density, with pines and larger hardwoods particularly preferred.

g. Heritage Resources

In areas where potential resource disturbing activity is planned and implemented, it would be necessary to comply with Section 106 of the National Historic Preservation Act and consult with the Oregon State Historic Preservation Office (SHPO), either through a programmatic agreement, memorandum of agreement, or full Section 106 consultation. Heritage surveys for each proposed component project of the Upper Applegate Watershed Restoration Project undertaking would be conducted and a required Section 106 compliance report would be developed for each. Surveys would be designed using the Rogue River National Forest Cultural Resource Inventory Strategy Plan (CRISP; LaLande, 2000). This survey strategy was approved by SHPO, but requires renewal every 5 years. Based on physiographic variables; it stratifies forest lands into areas of having a high, medium, or low probability of containing cultural resources. The CRISP also specifies the sampling intensity for each probability area; it requires that 100 percent of the high probability areas to be surveyed, while medium and low probability areas receive, 20 percent and 5 percent sampling, respectively.

IV. Monitoring

The Forest Service has experience with multiparty monitoring, which can be an effective way to build trust and collaborate with local communities and diverse stakeholders, including interested citizens and Tribes. Multiparty monitoring would be subject to available funding and the ability of stakeholders to contribute funds or in-kind services.

a. Introduction

A Monitoring Plan would identify objectives for monitoring, specific items to be monitored, protocols for monitoring, and mechanisms for implementing the monitoring plan. There is a great deal to learn about the ecological effects of various restoration treatments and how they can be most effectively implemented to produce desired outcomes. Thus, well-designed multiparty monitoring programs should be built so that adaptive management can occur. Quantitative monitoring should be ongoing to assess project layout and implementation and evaluate treatment effects across a variety of different stand types.

The following section provides a “framework” or strategy for development of a monitoring plan.

b. Monitoring Framework

This section discusses monitoring elements and requirements that would be specifically designed for proposed management activities, under the recommended strategy for action, or any other action selected under the NEPA process. Monitoring is important for tracking the implementation of a project; ensuring projects are implemented as planned, as well as to measure success in meeting the stated project goals, objectives, and required mitigation.

When designing a monitoring plan, a full spectrum of techniques and methods should be used to evaluate the results obtained from monitoring. Evaluation techniques include, but are not limited to:

- Site-specific observations by on-site resource specialists.
- Field assistance trips by other technical specialists.
- On-going accomplishment reporting processes.
- Formal management reviews on a scheduled basis.
- Discussions with other agencies and various public users.
- Interdisciplinary team reviews of monitoring results.
- Involvement with existing research activities.
- Review and analysis of records documenting monitoring results.
- Re-measuring existing permanent inventory plots.

Recommended Monitoring Elements

Project activities should be monitored during and after implementation of management actions to ensure that design features and mitigation measures are implemented as specified. Monitoring is also proposed to evaluate the effectiveness of planned activities, including standard practices and mitigation measures, in achieving desired project outcomes. Lessons learned from monitoring and evaluation should be incorporated into future project planning efforts. If monitoring indicates that laws, regulations, standards or critical objectives are not being met, the project should be modified as necessary.

The following monitoring evaluation questions are designed for application to selected actions considered in detail under this NEPA process. Questions would be further developed for implementation specific to the selected alternative, based on decisions documented in a forthcoming Record of Decision.

Implementation Monitoring

Implementation monitoring asks the question, did we implement the project as outlined in the decision document, including consistency with land allocations guiding the implementation of management activities in the Upper Applegate watershed? The following specific evaluation questions would be used to complete implementation monitoring:

- 1) Were treatments implemented according to design criteria including appropriate mitigation measures and management constraints outlined in the decision description and associated listing of Mitigation Measures and Management Constraints? If implementation deviated from design criteria and mitigation measures, document how and why implementation deviated and whether the desired objectives were achieved.
- 2) Were restoration treatments implemented according to the schedule outlined in the decision document?
 - How many acres were planned for implementation by treatment method, by fiscal year?
 - How many acres were treated by treatment method, by fiscal year?

Results of implementation monitoring should be documented by area, or groups of units, for review by the Responsible Official and placed in the project file. Funding to complete implementation monitoring is included in project costs.

Effectiveness Monitoring

Effectiveness monitoring answers questions concerning whether the implementation of proposed fire hazard reduction activities were effective in achieving the overall Purpose and Need for the project, as well as goals and objectives of the management land allocations guiding the implementation of management activities in the Upper Applegate watershed.

The effectiveness of actions in obtaining overall long-term goals would eventually be demonstrated when a fire start burns across a landscape as a low intensity fire with low-moderate severity effects on forested conditions.

V. Actions and Alternatives Considered But Eliminated From Further Analysis

Iterative NEPA (or iNEPA, 36 CFR 22) is a process of developing and incrementally improving proposed actions through collaboration with the public as agencies engage in the scoping, notice and comment processes required by NEPA regulations. This process is intended to continuously improve proposed actions throughout the NEPA process. NEPA requires that Federal agencies explore all reasonable alternatives and briefly discuss the reasons for eliminating any alternatives that were explored but not developed in detail (40 CFR 1502.14 (a)).

Utilizing the iNEPA process, the Upper Applegate Watershed Restoration Project has gone through several iterations to fine tune the Proposed Action. Elements of the Proposed Action that have been dropped or improved become actions eliminated from detailed study. Appendix A describes how the original Proposed Action has been modified to the current version that is being analyzed in detail in this EA. Appendix B also describes actions or strategies submitted during the scoping process that have been eliminated from further analysis.



Ponderosa pine stand near Flumet Flat Campground (Photo US Forest Service)

CHAPTER 3. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This Chapter describes the environmental impacts of implementing the Proposed Action as compared against the current condition.

I. Introduction

This chapter is separated into two major sub-sections: Sub-section II reviews how well the Proposed Actions attains the Purpose and Need while sub-section III focuses on describing the current condition and environmental consequences linked to relevant issues presented in Chapter 1.

The analysis of environmental effects is framed within the context of Federal laws, National policies, regional Standards and Guidelines, and compliance with the Rogue River National Forest LRMP, as amended by the Northwest Forest Plan and BLM's Southwest Oregon 2016 Resource Management Plan.

II. Attainment of Purpose and Need

This Section takes a closer look at the attainment of the Purpose and validation of the Need for the Upper Applegate Watershed Restoration Project. For the purpose of this analysis, indicators coinciding with key words or “elements” underlined below in the Purpose and Need statements are used to compare the Proposed Action against the current condition.

As introduced in Chapter I:

The **Purpose** of the Proposed Action is to protect and enhance the important community and agency identified values through adaptive planning and implementation techniques.

The underlying **need** for action is to restore ecological and social conditions and processes in the Upper Applegate watershed to provide for landscape conditions resilient to disturbances and climate change.

a. Natures Benefits

To evaluate the purpose statement, “... protect and enhance the important community and agency identified values ...” a discussion is presented around nature’s benefits. As discussed in Chapter 1, nature’s benefits are the goods and services that people receive from natural systems. The Upper Applegate Watershed Restoration Project is the result of an iterative and collaborative process that is designed to restore, protect, or enhance community and agency identified values.

In addition to prioritizing public engagement, this process applies science-based information across disciplines and takes an integrated approach to forest stewardship. Ecological processes, functions and resulting benefits are supported by actions designed and analyzed across program areas. This section briefly highlights these connections, which are described in detail for each of the three major themes.

Water and Aquatic Habitat

Water quality, quantity and aquatic habitat are influenced by geology, landforms, soils, vegetation characteristics, and disturbance, among other factors including built infrastructure and human use. As described in the Soil and Site Productivity section of this chapter, management actions that sustain soil health have a bearing on the landscape’s water holding and filtration capacity. Soil porosity and organic matter influence water storage and nutrient cycling. To sustain these functions, activities under the Proposed Action apply design criteria and mitigation measures to maintain site productivity, control erosion and avoid groundwater interception (see [Soil and Site Productivity](#) and [Hydrologic Function](#)).

High severity wildfire poses a threat to water quality by increasing delivery of sediment to the system, resulting in potential pool filling, channel widening and stream bank failures (see [Hydrologic Function](#)). Under current fuel loading conditions, a wildland fire in the Upper Applegate watershed would likely result in moderate to high soil burn severity, with subsequent sedimentation occurring outside of the natural range of variability (see [Sediment Delivery](#)). Extensive mortality in Riparian Reserves could also affect stream temperature and habitats (see [Hydrologic Function](#) and [Riparian Reserves](#)). Proposed thinning and fuels treatments are designed to minimize impacts on aquatic habitats while increasing the resilience of the watershed to disturbance (see [Disturbances](#) and [Aquatic Habitat and Fish](#)). Treatments in riparian areas are intended to reduce the risk of high severity wildfire while expediting the growth of residual trees that maintain stream shade, providing long-term benefits for water quality and aquatic habitat.

Sustaining native plant populations in the watershed is also beneficial for water and habitat conditions. Riparian vegetation provides fine organic inputs that benefit macro-invertebrate and macrophyte (aquatic plant) populations, which are vital for sustaining food webs (Lorenz et al. 2012). Avoiding impacts to sensitive plants and preventing the spread of invasive species is critical for biodiversity as well as watershed function (see [Botanical Populations and Habitat](#) and [Non-Native Plant Species](#)). Invasives generally have a negative effect on water regulation. They can alter channel morphology, decrease water holding capacity, and thereby increase flood risk (Pejchar and Mooney 2009, Charles and Dukes 2007, Eviner et al. 2012). Water quality may also be compromised by erosion if invasives alter soil properties or if their root structures decrease soil stability.

Terrestrial Biodiversity

Biodiversity is characterized by the Millennium Ecosystem Assessment as an essential underpinning of ecosystem health and function with subsequent effects on benefits provided by ecological systems (MEA 2005). As stated by Mace et al. (2005), “direct benefits such as food crops, clean water, clean air, and aesthetic pleasures all depend on biodiversity, as does the persistence, stability and productivity of natural systems.” The diversity of the plant, animal, and microbial species living within a community influence critical processes including plant productivity, soil fertility, water quality, nutrient cycling, pollution and waste reduction, biomass accumulation, resistance to disease and disturbance, and other environmental conditions that affect human welfare (Naeem et al. 1999, Tilman 1997). Biodiversity can also be valued for its intrinsic worth, or existence value, and may provide potential future benefits that are yet unknown or unrecognized (Tilman 1997).

The Upper Applegate watershed is located in the ecologically diverse Oregon Klamath Physiographic Province. The Proposed Action aims to protect existing critical habitats from wildfire risk, while allowing ecological process to sustain diversity on the landscape (see [Terrestrial Wildlife Species and Habitats](#), [Threatened and Endangered Wildlife Species](#), [Late-Successional Habitat](#) and [Botanical Populations and Habitat](#)). Actions that achieve multiple benefits are emphasized. These include thinning and prescribed fire to enhance forest complexity and diversity, increase resilience to disturbance, and improve species richness. For example, treatments proposed in strategic locations are intended to reduce fuels and risk of high severity fire and provide opportunities to introduce prescribed fire into the watershed at a scale that would maintain certain desired habitat types such as open, late seral with large ponderosa and sugar pine, and mature oak trees (see [Threatened and Endangered Wildlife Species](#)). Restoring a mosaic of seral stages can sustain a diversity of vegetation types, from late-successional species to open landscapes with native herbaceous flowering plants that provide habitats for pollinators.

Pollinators have important ecological and cultural value. Virtually all of the world’s seeded plants require pollination. Wildflowers in particular benefit from pollinators, which help these plant species reproduce and maintain genetic diversity.

Culturally, pollinators help sustain native non-timber forest products, such as first foods and medicinal plants. Spurred by the “...critical importance of pollinators to the economy, including to agricultural production and general ecosystem services,” a Presidential Memorandum on pollinator health was released in 2014. A critical component of pollinator habitat enhancement involves increasing native vegetation through application of pollinator-friendly seed mixes in revegetation, rehabilitation, and restoration of aquatic and terrestrial ecosystems. These best management practices would be implemented within the Upper Applegate watershed, where practical (see [Terrestrial Wildlife Species and Habitats](#)).

Community and Culture

Cultural ecosystem services include connections between people and the land that may be intangible, such as spiritual enrichment, heritage, identity, and aesthetic values. Cultural benefits also include practices like harvesting of first foods for Native American tribes, rituals in sacred places, recreation activities, and sense of place.

People and communities can develop connections to specific locations, features or landscapes. Memories, interactions, and history play a role in visitors’ and residents’ attachment to the land (Eisenhauer et al. 2000, Kruger and Jakes 2003). The draw of these places and experiences can influence where people live, work, and recreate (Smith et al. 2011). A growing body of literature highlights the benefits of access to the outdoors for mental and physical health. Time spent in nature reduces stress and anxiety and can even improve educational outcomes and work productivity (Wolf et al. 2013). Outdoor experiences are also conducive to community cohesion and strengthen connections with others (Weinstein et al. 2015).

Effective stewardship of ecological structures, processes, and functions sustains culturally important natural resources, places, and traditions, as well as connections between people and landscapes (Hess et al. 2008, Lynn et al. 2011). Consultation with Native American tribes is critical to understand relationships between restoration actions and cultural heritage. Proposed actions will also aim to enhance conditions for bear grass while protecting existing plants. Traditional Ecological Knowledge will be applied to burning and restoration practices to maximize their success.

In addition to integrating cultural heritage and tribal treaty rights with restoration of ecological functions, the Upper Applegate watershed provides a variety of recreational experiences. Under the Proposed Action, additional motorized and non-motorized trails would be incorporated into the trail system, considerably increasing the recreation opportunities in the Upper Applegate watershed (see [Recreation](#)). Proposed fuels treatments and trail development would be designed to limit impacts on the character of Inventoried Roadless Areas to provide amenity values associated with old-growth forest while sustaining dispersed recreation opportunities over time. These recreation offerings are intended to address the values of diverse constituents, including those who seek quiet and solitude, and those who wish to use mechanized equipment (see [Recreation](#), [Sound Disturbance](#) and [Inventoried Roadless Areas](#)). Stewardship of recreation opportunities is coupled with consideration of the scenic quality of the watershed. The Proposed Action is design to meet visual quality objectives defined in the Rogue River-Siskiyou National Forest’s Land and Resource Management Plan and the Southwestern Oregon Record of Decision and Resource Management Plan and recognizes aesthetic character as a public value (see [Scenic Quality](#)).

A critical concern addressed in this and previous planning efforts (AMA Guide, Applegate Fire Plan, and Applegate Valley Strategic Plan) is to protect communities at risk from wildland fire. The Proposed Action addresses this risk while considering the need to sustain ecological processes and provide a diversity of benefits. The public engagement process emphasized information exchange to increase understanding about connections between human benefits and ecosystems, while encouraging dialogue among stakeholders, the Forest Service and the BLM.

b. Disturbances

To evaluate the need statement, "... landscape conditions resilient to disturbances and climate change ..." a discussion is presented around disturbance. Disturbances influence vegetation distribution, structure, and composition, and may indirectly and directly interact with one another and with changing climate to affect landscapes. Although there are many potential disturbance agents (wind, earthquake, floods to name several), this analysis is focused primarily on two disturbance agents important to this analysis. They include fire and insect and disease. These two disturbance agents play a large role in the Upper Applegate watershed. This restoration project is designed to improve conditions that would minimize the negative impacts from fire or insect and disease infestation and improve resiliency.

Past practices of fire exclusion, forest management practices that have led to altered disturbance regimes, and the increased role of altered climate regimes have left a landscape that is more vulnerable to uncharacteristic fire, insect outbreaks and disease.

Fire

Fire exclusion and suppression began in the Upper Applegate watershed over one hundred years ago. Historically frequent fire would have been widespread across the landscape. Evidence of this occurs in the Upper Applegate watershed with measured mean fire return intervals of 18 years (Agee 1993), estimates of 8-10 years (Beaver and Palmer WA 1994) and spatial data from Landfire estimating 95.5% of the landscape having a mean fire return interval of 6-15 years.

A recent historical fire regime study with plots located throughout Southern Oregon was published in 2018. One plot in the study was located in Star Gulch. Fire history from 11 trees were measured in this plot and showed the last fire occurring in this plot in 1823. The range of historic fire return was measured at 4-31 years with a mean of 12 years (Metlen et al., 2018).

Though fire return intervals were not measured throughout the Upper Applegate watershed, climatic conditions and historic burning by Native Americans would have led to high frequency, low/mixed severity fire regime. Frequent fire would have created conditions consistent with a fuel limited system, with low to mixed severity fire consuming surface fuels and reducing encroaching conifer in most stands.

Over time fire exclusion coupled with other management actions have led to uncharacteristic vegetative conditions that are less resilient to future disturbances. Dry forests of southwest Oregon have evolved and rely on fire as a natural disturbance process to drive structure and function. In fire prone ecosystems, pyrodiversity drives biotic, successional patch, and habitat diversity (Hessberg et al., 2016).

Currently as modeled by the Forest Service Wildfire Hazard Potential project, 62% of the watershed is mapped at being high risk for a wildland fire that would have the relative potential of being difficult for suppression resources to contain. This metric, though coarse in scale and dependent on conducive weather conditions can be informative in that areas mapped with higher WHP values represent fuels with a higher probability of experiencing torching, crowning, and other forms of extreme fire behavior that in turn would put values at risk to uncharacteristic fire conditions (Dillon et al., 2015).

Within the Upper Applegate watershed the Burnt Peak fire burned 4,147 acres in the summer of 2017. The majority of the fire area experienced low to moderate severity fire well within the historic range of variability despite having fire primarily absent from much of the area for an extended period of time (81 years). The Burnt Peak fire started on August 11 and burned into September, a period often associated with uncharacteristic or extreme fire behavior in Southwest Oregon.

However, during this time heavy smoke produced by the many surrounding fires in Southern Oregon and Northern California covered the region. This inversion created by stable atmospheric conditions reduced fire intensity by shading fuels, raising surface temperatures and not allowing relative humidity to drop below critical values as is common in August. During this time fire slowly backed from the ridges to containment lines in the valley bottoms leading to primarily low to moderate severity fire.

The Burnt Peak fire resulted in a patchwork of burn conditions well within the historic range of variability. Much of the fire area was untreated and did not experience catastrophic or extreme fire effects. However, like fire modeling under extreme weather scenarios, fire behavior exhibited during the 2017 Burnt Peak fire should not be interpreted as indicative of all future fires in the Upper Applegate watershed.

Previous treatments in the Upper Applegate Road Hazardous Fuels Project and prescribed fires conducted for wildlife and oak enhancement gave fire managers control points to work from, especially as fire approached the Wildland Urban Interface (WUI). If the ecological role of fire is to be restored to the landscape, future fuels and restoration work must be accomplished and maintained to aid in management of fire.

Large investments have been made in fuel reduction projects, prescribed fire and wildlife habitat enhancement projects in the past 20 years in the Upper Applegate watershed. In an area adapted to frequent fire, maintenance of those treatments through the continued use of prescribed fire or managed wildfire is designed to restore a natural disturbance regime, maintain treatment effectiveness and capitalize on initial investments already made (Hessburg et al., 2016, Finney et al., 2007).

Proposed vegetation management treatments are meant to further increase resiliency throughout the Upper Applegate watershed by improving vegetation conditions and structure by reducing density, increasing canopy base height, removing encroaching conifers and reducing surface and ladder fuel loading through the use of thinning and prescribed fire. The principles of these treatments and corresponding changes in fire behavior are displayed in Table 3-1.

Table 3-1. Principles of fire resistance for dry forests (adapted from Agee, 2002 and Hessburg and Agee, 2003)

Principle	Effect	Advantage	Concerns
Reduce surface fuels	Reduces potential flame length	Control of fire easier; Less torching	Surface disturbance less with fire than other techniques
Increase height to live crown	Requires longer flame to begin torching	Less torching	Opens understory; may allow surface wind to increase
Decrease crown density	Makes tree-to-tree crown fire less probable	Reduces crown fire potential	Surface wind may increase and surface fuels may be drier
Keep big trees of resistant species	Less mortality for same fire intensity	Generally restores historic structure	Less economical; may keep trees at risk of insect attack

Restoration and improvement of vegetative conditions in the Upper Applegate watershed would require a combination of treatments including thinning, prescribed fire, invasive species and weed management as well as planting of native species. Future disturbance in the watershed is inevitable, however restoration of more resilient vegetation patterns can help realign future disturbance effects as well as promote natural post disturbance recovery (Hessburg et al., 2015).

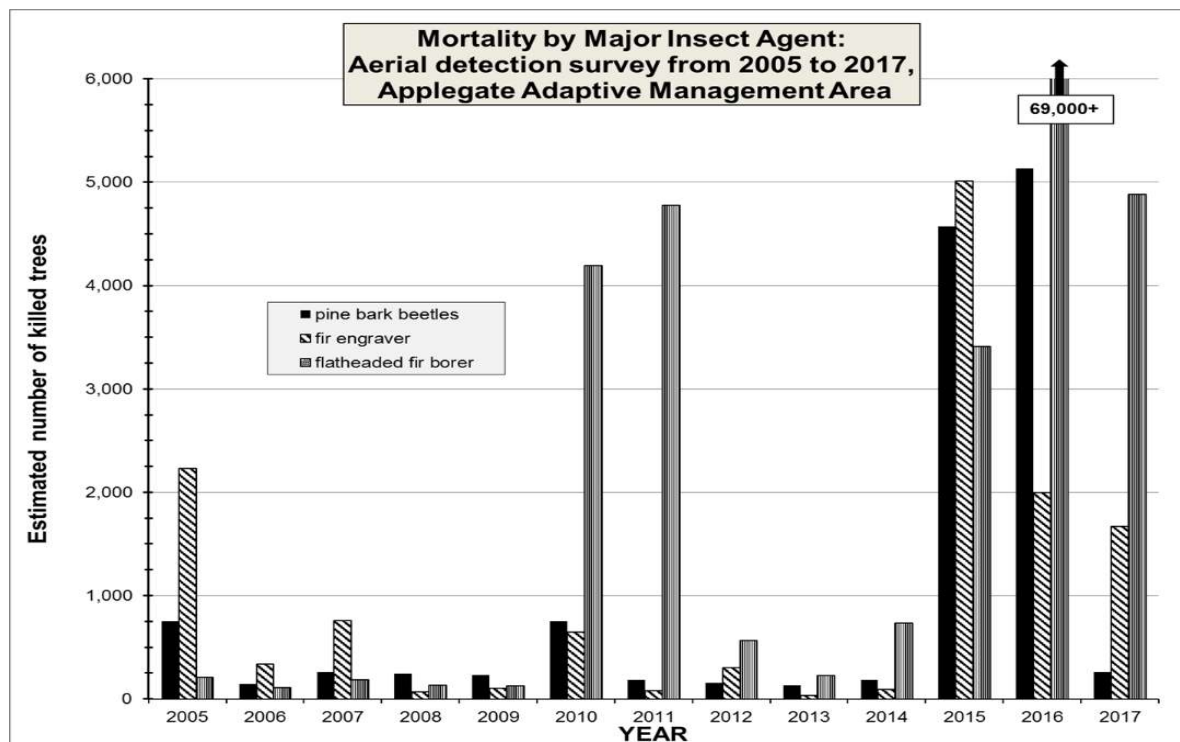
Insect and Disease Related Tree Mortality

Native insects and tree diseases are integral components of forest ecosystems. Through their actions, they affect spatial and temporal stand density; structure and forest succession; forest nutrient cycling; genetic structure of forest stands; pollination of plants; and insect natural enemies. Their impacts can be as pests, benefactors or neutral components in ecosystems.

The activity of forest insects and tree diseases are influenced by fire, drought, and weather patterns, among other environmental influences. Stress exerted by these environmental influences reduces host tree resistance to insect infestation and disease infection. Additional reductions in resistance due to increased host stress may accrue due to properties of the soil, particularly interacting with precipitation amount and timing, as well as other limiting habitat characteristics. Stressors and reductions in host resistance increase the amount of tree mortality due to insects and diseases.

In the Upper Applegate watershed, there are four groups of native forest insects and tree diseases that are important disturbance agents, as follows: bark beetles; woodborer beetles; dwarf mistletoes; and root diseases. Of these, most tree mortality in the Upper Applegate area is caused by bark beetles and woodborers (Figure 3-1).

Figure 3-1. Aerial detection survey results for the Applegate watershed.



Data source: <https://www.fs.usda.gov/detail/r6/forest-grasslandhealth/insects-diseases/?cid=stelprdb5286951>.

Bark Beetles

Several species of native bark beetles (Family Curculionidae, subfamily Scolytinae) cause mortality of conifers in southwest Oregon. The most prominent species in the Upper Applegate watershed include western pine beetle (*Dendroctonus brevicomis*) on ponderosa pine; mountain pine beetle (*Dendroctonus ponderosae*) on ponderosa, western white, and sugar pines; Douglas-fir beetle (*Dendroctonus pseudotsugae*) on Douglas-fir; and fir engraver (*Scolytus ventralis*) on true firs. Of all these, bark beetles in pines exert the largest impact in the Upper Applegate watershed.

Western pine beetles frequently infest the largest ponderosa pines in a stand and/or groups of smaller ponderosa pines in dense thickets. Mountain pine beetles often infest small or intermediate-sized ponderosa pines in groups and scattered mature sugar pines of all sizes. Mountain pine beetles attack and kill mature sugar and western white pines of all sizes and are the primary source of large sugar pine mortality. Pine engraver beetles (*Ips* spp.) infest freshly cut or downed, broken material larger than 3 inches in diameter and may emerge from this to attack tops or entire standing pines, especially during drier than normal years.

The fir engraver can be a substantial cause of mortality to true firs (*Abies* spp.), although infestation can occur repeatedly without causing host mortality. Fir in stands with less than 25 inches of average annual rainfall and stands during and right after substantial drought events are especially prone to extensive and intense episodes of mortality caused by fir engraver.

Douglas-fir beetle activity in the Upper Applegate watershed is generally at low to very low levels primarily in recently downed or broken host material larger than 10 inches in diameter.

Woodborer Beetles

Woodborer species in conifers occur in three families of beetles and one of wasps. Almost all feed exclusively on dying and recently dead material and are prominent members of the decomposition guild or “clean-up crew”. However, one woodborer beetle species in the family Buprestidae is known to kill stressed hosts and, at times, hosts that appear to be healthy. The flatheaded fir borer, *Phaenops drummondi*, is the primary source of conifer mortality in the entire Applegate watershed, as the chart of aerial detection survey data illustrates (Figure 3-1.)

Flatheaded fir borers are especially active in dense Douglas-fir stands at low elevations, on drier aspects, and on harsh sites. Flatheaded fir borer activity is associated with drier than normal years and especially with several consecutive years of droughty conditions accompanied by above average temperatures. Flatheaded fir borers infest Douglas-fir of all sizes and frequently kill trees in groups.

Recent work from the Southwest Oregon Forest Insect and Disease Service Center (USDA Forest Service, Forest Health Protection) working with others has yielded more biological details and an estimation of risk factors. The map of Upper Applegate watershed available water storage (Figure 3-2) shows that a majority of the area has low to very low water storage capacity. Areas with low to very low water storage capacity have and would continue to experience substantial amounts of stress, especially during and just after drought periods, and vegetation unable to sustain such dry conditions would fail.

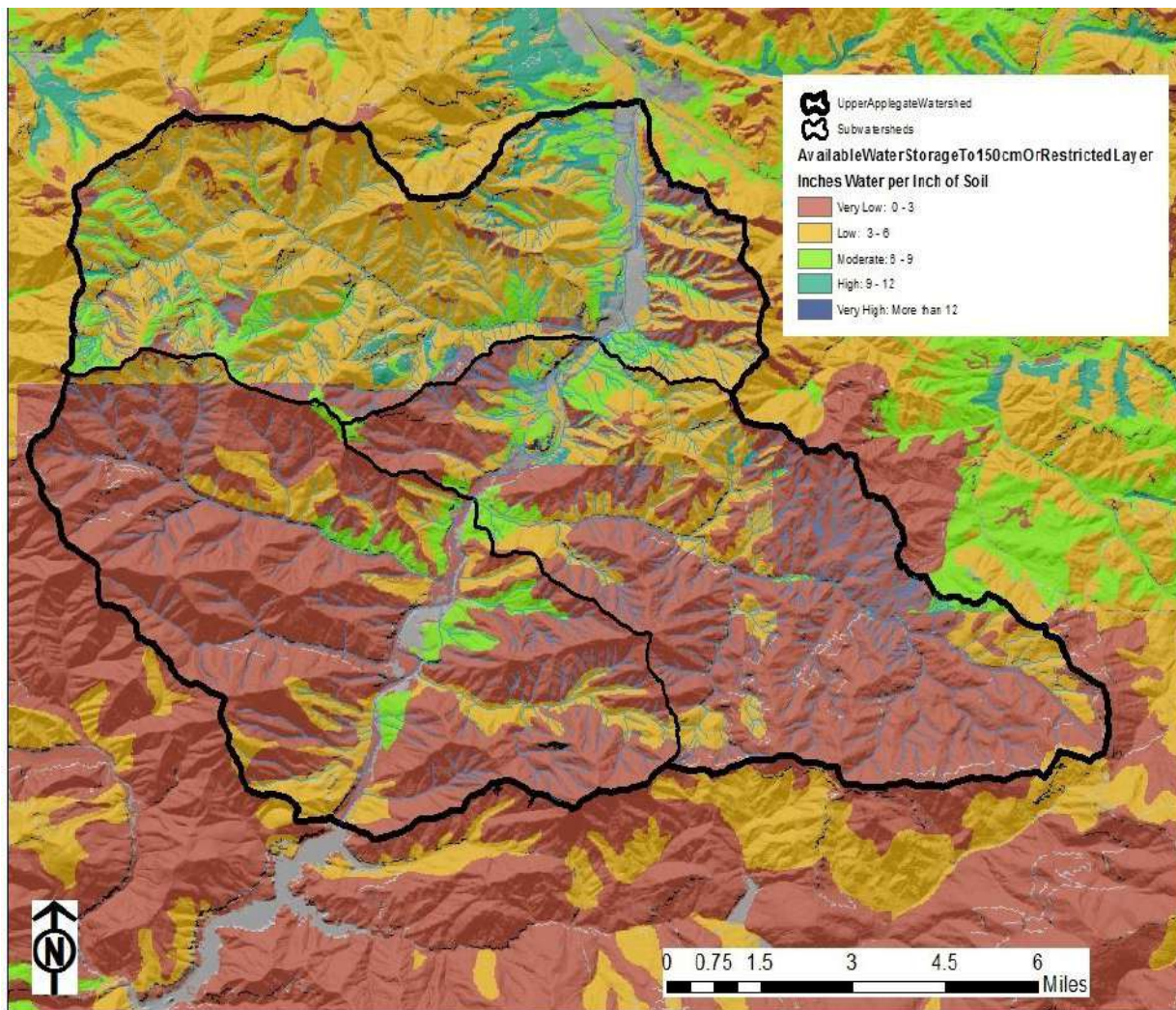
Dwarf Mistletoes

Dwarf mistletoes (*Arceuthobium* spp.) are parasitic flowering plants. Several species occur in the Upper Applegate watershed and each is host-specific. The species on Douglas-fir, *Arceuthobium douglasii*, is of special concern. Dwarf mistletoes cause decreased growth, stem and crown distortion, and, in some cases especially with Douglas-fir dwarf mistletoe, tree mortality. They also result in tree forms that are preferred nesting habitat for the northern spotted owl and other species of concern.

Root Diseases

Several fungal root diseases are found in the Upper Applegate watershed. The most common are Armillaria root disease, caused by *Armillaria* spp., and Heterobasidion root disease, caused by *Heterobasidion occidentale*. Armillaria root disease can occur on any conifer species, yet has its greatest effect on white fir, Douglas-fir and oaks; Heterobasidion root disease affects all true fir with its greatest impact to white fir in the area. Both root diseases cause host mortality and butt rot and both are diseases of the site. Root disease effects are minimized in vigorous stands that contain major components of non-hosts.

Figure 3-2. Upper Applegate Watershed Available Water Storage

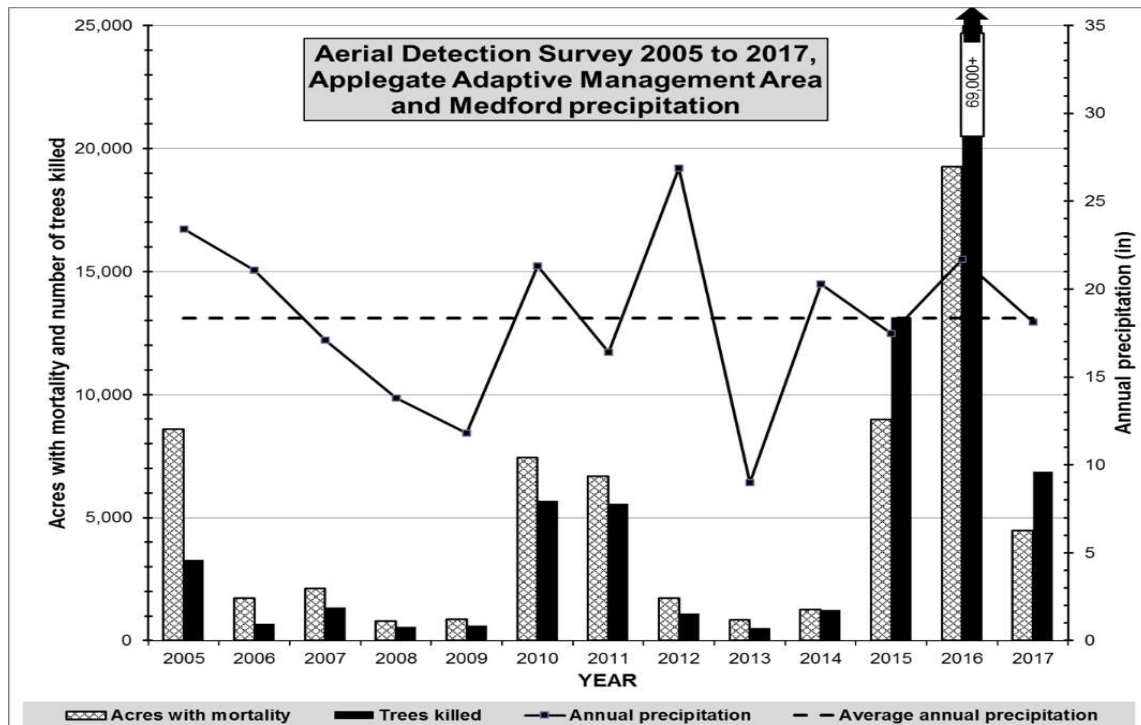


Under the current condition, many stands in the Upper Applegate watershed are and would remain densely stocked and therefore would continue to be susceptible to pine bark beetle and flatheaded fir borer infestation. In the absence of fire or management actions reducing stocking, stand densities over time would continue to increase over the already high levels that exist, further elevating the likelihood of insect- and disease-caused mortality. Some kinds of stands, stand components, and individual trees would be especially hard hit including the densest stands with pine components, dense Douglas-fir stands below 3,500 feet in elevation, and large heritage pine and Douglas-fir surrounded by dense understories.

The mortality of large heritage ponderosa and sugar pines from pine bark beetles is occurring at a rate that exceeds replacement. This is primarily in response to high stand densities created by the abundance of more shade tolerant tree species such as Douglas-fir and white fir. Many of these shade-tolerant trees established during cooler, wetter conditions that ended sometime in the mid-19th Century, followed by warmer, drier weather patterns and an increasing lack of disturbance due to fire exclusion and past management practices. This ingrowth created competition and stress that reduced pine resistance to bark beetle infestation by lowering host vigor and maintaining habitat conditions favorable to beetle success (Fettig and others 2007).

Insect-caused mortality has increased during and especially just following drought, as Figure 3-3 illustrates, and this increase has been substantial. The interaction between high stand density, higher than average air temperatures and drought further enables this mortality.

Figure 3-3. Tree mortality from 2005 through 2017 in the Applegate watershed.



Droughts appear to be more frequent and severe, as well. It is assumed that a drought and especially a severe drought accompanied by high temperatures such as occurred in 2013, for example, injures the trees such that recovery requires more than simply the return of average or above amounts of annual precipitation (Young and others 2017). Such drier, warmer periods are often accompanied by increased fire activity.

If the Upper Applegate watershed were to burn in a large-scale, high intensity wildland fire, there would be insect ramifications. Fire-injured trees not killed outright would likely become more susceptible to attack by bark beetles, flatheaded fir borer and the “clean-up crew” of wood boring insects. Substantial infestation of such injured pines and Douglas-fir would be expected.

Under the Proposed Action, a decrease in vegetation density in treated areas is expected due to the use of prescribed fire, thinning, and a combination of these actions in managed and unmanaged stands. These density reduction actions would lower the probability of tree mortality from pine bark beetles both directly by creating more open habitats less favorable to bark beetle success and indirectly by improving host vigor through reduced competition for light and nutrients.

Thinning around legacy trees has the potential to at least stabilize growth and slow decline, while at best to increase their growth rate, vigor, and lower the probability of successful bark beetle attack. Either individual legacy trees or groups of legacy trees operating as an individual need sufficient space to accomplish this. The exact size required for an opening for individual tree culturing is not well researched.

However, recent research has shown that attempts to increase vigor of legacy trees while still maintaining closed canopy in dry, coniferous forest types by reducing stand density only around the immediate neighborhood of legacy trees would likely be unsuccessful if the radius is not greater than 30 feet (Hood and others. 2017).

The proposed treatments are likely to promote some regeneration of pines, especially with density reduction activity followed by prescribe fire. However, planting rust resistant sugar pine from the appropriate seed zone would increase the chance of regeneration survival and replacement of mature sugar pine, while amplifying rust-resistant genetic combinations found in the field and strengthened through traditional plant breeding techniques. Together with thinning around legacy sugar pine to mitigate losses, this has the potential to return sugar pine to the position it historically occupied in the long term and provide for the restoration of this important and challenged species.

Under the current condition and proposed actions, the only activities that would cumulatively occur on the same acre are density management and maintenance prescribed burning. In each instance either alone or in combination, repeating these density reduction actions would contribute to an overall decrease in the probability of mortality due to forest insects and tree diseases. Assuming these actions increase the spatial vegetative diversity, future tree mortality may be lowered due to breaking-up concentrated areas dominated by one species where these host-specific mortality agents may more fully exert their influence.

A cumulative effect of repeated density reduction and prescribed fire activity on the same acres would render those areas less likely to become overstocked and may favor regeneration of shade intolerant pines. An accumulation of treated stands at lower risk to bark beetle mortality due to density reduction would eventually provide a landscape scale reduction in such losses, adding further resilience and possibly increasing longevity of isolated legacy pines. Planting rust-resistant sugar and western white pine would have the cumulative effect of increasing the population resistance to white pine blister rust. Because *Heterobasidion* root disease is spread by windborne spores that land on and colonize recently created stumps or wounds, untreated fir stumps and large wounds that become infected would increase the inoculum load in an area. These infected fir would then serve as sources of additional inoculum, the larger the root mass the more inoculum, and eventually increase mortality of true fir.

c. Climate Change

Climate change is expected to profoundly alter vegetation structure and composition, terrestrial ecosystem processes, and the delivery of important ecosystem services over the next century (Peterson et al, 2014). According to the latest Intergovernmental Panel on Climate Change report (AR5), each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850. The globally averaged combined land and ocean surface temperature data as calculated by a linear trend show a warming of 1.53°F over the period 1880 to 2012 (IPCC, 2014).

In the Northwest, temperatures increased across the region from 1895 to 2011, with a regionally averaged warming of about 1.3°F (Mote et al, 2014). Projected annual temperature increases in southwest Oregon are expected to average around 7.56°F with a projected summer increase of around 9.36°F and a decrease in summer precipitation of up to 30% by 2100 (Halofsky et al, 2016).

With an increase in temperatures and changes in precipitation patterns some of the current major impacts and future predictions expected in the region include, but are not limited to (Myer et al, 2013):

- Reducing snowpack accumulation possibly to 20% of historical patterns by late century
- Shifting precipitation patterns with heavier downpours
- Shifting precipitation from snow at high elevations to rain
- Earlier snowmelt, and melting glaciers

- Earlier peak in stream flow
- Reducing stream flow in late summer and fall
- Increasing flooding especially in winter and spring
- Degrading water quality/quantity (warmer rivers and oceans, water borne illness,)
- Increasing frequency and severity of heat waves and droughts
- Increasing frequency, severity, extent, and duration of wildfires
- Increasing extreme weather events (storms, blizzards, etc.)
- Increasing spread of human and crop pathogens, parasites and diseases
- Changes in forest productivity patterns due to the above
- Changes in seasonal climate patterns disrupting natural ecosystem function
- Critical threshold events that would impact wildlife (floral and faunal) species and potentially increase extinction rates.

Climate change modeling projections for future vegetation communities suggest that the range of lower elevation grasslands, chaparral and montane forests are likely to expand while higher elevation alpine and subalpine forests are likely contract under a warming climate scenario (Halofsky et al, 2016). Hotter summer temperatures, less snow pack and drier summers, all conditions linked to large fire years would likely lead to an increase in fire frequency, duration and possibly severity of wildfires in southwest Oregon. Modeling has also projected an annual increase in very large fires (>12,000 acres) in the western United States of up to a factor of 4 for the years 2041-2070 when compared to their occurrence from 1971-2000 (Barbero et al, 2015).

In fire prone ecosystems such as southwest Oregon, fire is a natural process that shaped the landscape for millennia. However, amplification of this process due to climate change could put vulnerable species and habitats at a greater risk to loss and undesirable future conditions. Fire patterns have been shown to repeat or self-reinforce fire intensity in re-burned areas leading to type conversions from forested to non-forested vegetation (Coppelatta et al, 16; Perry et al, 2011; Grabinski et al, 2017). This self-reinforcing pattern emphasizes the importance of improving stand resiliency and reestablishing a low/mixed severity fire cycle as a means of mitigating future high severity fire. Altering conditions so that disturbance processes can act to increase, rather than reduce, forest heterogeneity may provide ecosystems with the ecological flexibility to withstand and persist through future changes in climate and climate-related processes (Coppelatta et al, 16).

The Proposed Action includes management approaches in the face of potential increases in temperature and decreases in precipitation and snowpack accumulation. These management actions focus on the restoration of physical and biological processes and patterns that create and maintain diverse networks of habitats for plant and animal populations. Treatments focusing on low elevation oak and pine savanna coupled with prescribed fire and native plant enhancement would improve the integrity and resiliency of these systems. Treatments would also include managing forest densities through commercial and non-commercial thinning for reduced susceptibility to drought stress and using prescribed fire to reduce susceptibility to high-intensity, large disturbances.

These strategies were identified for the Upper Applegate watershed and consistent with the following restoration strategy recommendations from the Synthesis of Science to Inform Land Management within the Northwest Forest Plan Area (Spies et al, PNW-GTR-970, 2018)

Restoration Strategies for Cultivating Resilience to Climate Change and Fire

- Variable-density or low thinning in plantations in moist and dry forests to increase ecological heterogeneity and accelerate growth of large trees and tree crowns.
- Variable-density or low thinning along with prescribed fire in burning older forests in very frequent/low-severity and frequent/mixed-severity fire regime forests. These would be done to increase resilience to fire and climate change by restoring diverse and fire-tolerant structures and compositions of older forests, and of other successional stages, that would ultimately succeed to old-forest conditions.
- Careful use of prescribed fire and managed wildfires in fire-prone low- and mixed-severity fire regime forests to restore key ecological processes while protecting critical areas of dense, older forest conditions and other values that may not be resilient to fire.
- Creating diverse early-successional habitat where feasible, given other ecological goals and social constraints. The strategy for doing this could include variable-retention silviculture and prescribed fire in plantations and in forests more than 80 years old. Such practices are allowed in the NWFP in the matrix and may be appropriate if they are consistent with other landscape goals (e.g., creating or maintaining resilience to fire and climate change, providing habitat for spotted owls, and creating landscape-scale successional diversity).
- Using landscape-level management and conservation principles based on disturbance regimes, topography, species-specific climate refugia, spatial pattern, and departure from desired historical conditions.
- Management actions that promote resilience to wildfire and drought in fire-prone forest landscapes include thinning and prescribed fire to promote growth and restoration of large fire-resistant trees; reducing the vertical and horizontal continuity of forest fuels; restoring the patchwork of open and close canopy forests and tailoring these conditions to topography; and strategic work in forests with native diseases and insects to promote heterogeneity. These actions would promote a more desirable mix of low-, mixed-, and high-severity fires on the landscape.

There is agreement that the forestry sector contribution has declined over the last decade (IPCC, 2014; Smith et al., 2014; FAOSTAT, 2013). The main activity in this sector associated with GHG emissions is deforestation, which is defined as removal of all trees, most notably the conversion of forest and grassland into agricultural land or developed landscapes (IPCC 2000).

This restoration project does not fall within any of the main contributors of greenhouse gas emissions. Forested land would not be converted into a developed or agricultural condition. In fact, forest stands are being retained and thinned to maintain a vigorous condition that supports trees, and sequesters carbon long-term. US forests sequestered 757.1 megatonnes¹⁴ of carbon dioxide after accounting for emissions from fires and soils in 2010 (US EPA, 2015). However there is growing concern over the impacts of climate change on US forests and their current status as a carbon sink. There is strong evidence of a relationship between increasing temperatures and large tree mortality events in forests of the western US. There is widespread recognition that climate change is increasing the size and frequency of droughts, fires, and insect/disease outbreaks, which would have major effect on these forests' role in the carbon cycle (Joyce et al. 2014).

¹⁴ A megatonne is one million metric tons of CO₂; equal to about 2.2 billion pounds.

III. Environmental Impacts Associated With Relevant Issues

Relevant Issues presented in Chapter 1 are being addressed because of the extent of their geographic distribution, the context of associated consequences, the duration of the effects, or the intensity of interest or resource conflict. As discussed in Chapter 2, there are no alternatives to the Proposed Action. Effects of implementing the Proposed Action are compared against the current condition and the consequences of not implementing the Proposed Action.

These summaries of effects were considered during the analysis process as Relevant Issues. The full analysis of each of these issues is contained in the document Analysis of Relevant Issues – Upper Applegate Watershed Restoration Project and is available upon request or by going to the following website: <https://www.fs.usda.gov/project/?project=52305>

a. Botanical Populations and Habitats

Portions of the Upper Applegate watershed were surveyed for the Upper Applegate Road Hazardous Fuels Reduction project in 2009. A geospatial analysis of the remaining area was carried out to determine if suitable habitat potentially exists in unsurveyed areas. High priority and suitable sensitive plant habitat was identified and slated for surveys. Surveys for rare, sensitive, and survey and manage species were carried out in 2017. Consistent with the recovery plan two -year years of surveys for *Fritillaria gentneri* were completed in April/May 2017 and 2018.

Threatened and Endangered Plant Species

Fritillaria gentneri is an endangered (Federally and State listed as Endangered) plant species that is found within the project area, including within one proposed underburn unit. It is a member of the Lily Family (Liliaceae) and is found in a limited area of southwestern Oregon, with one known population in California. The species has a narrow worldwide distribution. It is confined within the Rogue and Applegate River Valleys in southwest Oregon. The epicenter of the species distribution is around Jacksonville, Oregon. The upper Applegate River is home to only a few scattered populations with limited individual flowering plants found at those sites. *F. gentneri* generally occurs in dry, mixed woodlands of Douglas-fir, California black oak, and/or Oregon white oak at lower elevations often in transition zones between plant communities. *F. gentneri* plants do not flower every year and non-flowering plants look like the common species, *F. recurva*.

Fritillaria gentneri is the only federally listed plant that has been found on the Siskiyou Mountains Ranger District and Ashland Resource Area. Two populations were known to occur on Forest Service lands within the Upper Applegate watershed prior to surveys. One new population was located during surveys in 2018. Additionally, two populations were known from proposed units on Ashland Resource Area lands. The majority of known sites of this species are located on privately owned lands and lands managed by the Bureau of Land Management.

Table 3-2. Summary of Effects to *Fritillaria gentneri* and habitat

Scale	Mechanism for Effect	Cause & Effect Relationship	Effects Call	Rationale
<i>Fritillaria gentneri</i> individuals	Trampling during cut & piling work, stacking piles on site, burning piles on individuals, high severity Rx fire.	Leave area/buffer PDC is meant to remove mechanisms that would cause effects. Therefore direct and indirect effects are not anticipated.	NE	One population with one flowering individual found in the lower portion of Unit 8, just above the Beaver Creek Road.
<i>Fritillaria gentneri</i> populations	None, expected to promote a beneficial mechanism for effects.	Action would increase flowering plants at three populations.	NLAA	This implements the recovery strategy for the species and would result in more stable populations over the long term.

Scale	Mechanism for Effect	Cause & Effect Relationship	Effects Call	Rationale
<i>Fritillaria gentneri</i> habitat	High severity Rx burning in habitat that removes or transitions it into alternative seral states such as increasing invasive plant cover.	Fritillaria Management Area (FMA) guidance to be followed within suitable habitat, reducing potential cause for negative direct or indirect effects	NLAA	Five FMA's would be designated across the RR-SNF. Three of them fall within this project area. FMA's would result in management of habitat that limits effects and is meant to benefit the species.
Effects Call: NE = No effect, NLAA = May Affect, but Not Likely to Adversely Affect				

In accordance with section 7(a)2 of the Endangered Species Act of 1973, as amended, the Rogue River-Siskiyou National Forest has requested informal consultation on this action. A Biological Assessment (BA) has been prepared and sent to the US Fish and Wildlife Service (USFWS) for concurrence on effect calls for the endangered plant *Fritillaria gentneri*. The RR-SNF is also working very closely with the USFWS to recover *F. gentneri* by taking a proactive approach by developing Fritillaria Management Area's (FMA). These FMA's would guide management within high suitable habitat for this endangered plant species. The three FMA's that fall within this planning area would provide valuable habitat characteristics for the furthest southwesterly known populations of this species.

Sensitive and Survey and Manage Plant/Fungi Species

The following table identifies the seven sensitive and one survey and manage vascular plant species that occur within proposed treatment areas of the Upper Applegate Watershed project. This analysis was planned and conducted based on the Region 6 Regional Forester's and Oregon/Washington State Director's 2015 Special Status species lists. These species/populations were either known from historical survey records or were discovered during analysis for this project. *Porella bolanderi*, a liverwort, was suspected but not known to occur in the Upper Applegate watershed, and was not located during surveys. No sensitive lichen or bryophyte species were discovered during surveys. It was determined during pre-survey analysis and through ongoing field checks that no habitat for Region 6 sensitive fungi is present within proposed treatment units, so those species were not analyzed further. The reason is because the vegetation and necessary climatic conditions are not present in this project area. None of the proposed treatments trigger equivalent effort survey and manage fungi surveys because there is no proposed commercial harvest in forests that would be characterized as "old growth" as defined in the NWFP.

Table 3-3. Known Sensitive/Survey & Manage Plant Species: Habitat and Locations

Species	Habitat in Upper Applegate Watershed	Area(s) Where Found
Milo Baker's cryptantha (<i>Cryptantha milo-bakeri</i> - CRM1)	Dry open gravel like soils on micro-ridges with very low canopy cover.	1 known population PCT/Rx Burn Unit: 81
Clustered lady slipper (<i>Cypripedium fasciculatum</i> - CYFA)	Mesic conditions under dense canopied Douglas fir forest, most often on north aspects.	11 known populations Rx Burn Units: 1, 2, 3, 5 & 9 PCT/Rx Burn: 201, 202, 248 Legacy Tree Unit: 41 Commercial Thin Unit: 51
Mountain lady slipper (<i>Cypripedium montanum</i> – CYMO) Survey and Manage Category C Species	Occupies same or similar habitat as clustered lady slipper.	1 known population PCT/Rx Burn Unit: 210
Red larkspur (<i>Delphinium nudicaule</i> - DENU)	Rocky thin soiled areas within Class 4 streambeds, and within scree and talus on steep slopes.	2 known populations Rx Burn Unit: 6

Species	Habitat in Upper Applegate Watershed	Area(s) Where Found
Bush beardtongue (<i>Keckiella lemmonii</i> - KELE)	Arid southerly facing slopes. Occurs in low canopy cover chaparral areas.	3 known populations Rx Burn Unit: 6 Fuels Maintenance Unit: 563
Holly leaf redberry (<i>Rhamnus illicifolia</i> - RHIL)	Dense chaparral pockets surrounded by Douglas fir/black oak forest.	3 known populations Rx Burn Unit: 5 & 6 Fuels Maintenance Unit: 563
Hill suncup (<i>Tetrapteron graciliiflorum</i> - previously known as <i>Camissonia graciliflora</i> – CAGR)	Grows on open graminoid and forb dominated balds, usually on clay dominated soils.	2 known populations Rx Burn Unit: 6 & 8
Giant death camas <i>Toxicoscordion exaltatum</i>	Found in sparsely vegetated loose talus like soils on upper ridges and saddles.	1 known population Rx Burn Unit: 1

Table 3-4. Summary of Effects to Known Sensitive/Survey and Manage Plant Species in Proposed Treatment Areas

Species	Mechanism for Effects	Cause and Effect Relationship	Effects Call	Rationale
Milo Baker's cryptantha (<i>Cryptantha milo-bakeri</i> - CRMI)	Trampling, burn pile placement, fire line creation.	These mechanisms could result in direct effects but the PDC would eliminate or minimize to negligible any mechanism/cause for effect.	MIIH	A no entry buffer area would be marked on the ground which would remove potential mechanisms that cause negative effects. Rx burning should not have negative effects because the vegetation type where this plant occurs cannot carry high severity fire.
Clustered lady slipper (<i>Cypripedium fasciculatum</i> - CYFA)	Host tree removal (mycoheterotropic species), canopy cover reduction, trampling/skidding, pile burn placement	Removing host trees and reducing canopy could cause indirect effects while direct effects from trampling & placing piles on plants could also occur. A PDC is in place to avoid these mechanisms/causes for effects.	MIIH	A no entry buffer area would be marked on the ground which would remove potential mechanisms that cause negative effects. Rx burning should be avoided in most cases. To implement adaptive management it may be useful to experiment with burning at a few populations in order to monitor effects.
Mountain lady slipper (<i>Cypripedium montanum</i> – CYMO) Survey and Manage Category C	Same as clustered ladyslipper	Same as clustered ladyslipper	MIIH	Same as clustered ladyslipper, except that because there is only one population there is no potential to implement experimental burning.
Red larkspur (<i>Delphinium nudicaule</i> - DENU)	High severity fire, but there is low probability considering the sparsely vegetated areas where this plant grows.	There is not a clear mechanism for effects so there is no expected cause for effects.	NI	There is a very low probability that high severity fire would negatively affect or extirpate populations of this species. The habitat the species grows within does not carry fire.

Species	Mechanism for Effects	Cause and Effect Relationship	Effects Call	Rationale
Bush beardtongue (<i>Keckiella lemmonii</i> - KELE)	Increased competition from invasive plants, trampling and cut/pile/pile burning and fireline construction.	This species would benefit from low to mid-severity fire by reducing competition over the long run. However, the habitat this species occupies is very susceptible to indirect effects from invasive plant colonization that could occur after Rx burning. Direct effects could occur from trampling during cut/pile/burn and fireline construction. PDC's to avoid these mechanisms for effects are in place.	MIIH	Backing low to moderate severity fire in and around populations is desired. However fire suppression actions could cause collateral damage, so no entry buffer areas would be marked on the ground. This PDC would remove potential mechanisms that cause direct negative effects. PDC's are in place to minimize the colonization and spread of invasive plants. However, it is impossible to entirely mitigate this threat. Areas in and adjacent to sensitive plant populations would be prioritized for funding early detection rapid response (EDRR) invasive plant surveys/treatments to further ameliorate these potential effects.
Holly leaf redberry (<i>Rhamnus illicifolia</i> - RHIL)	The main mechanism that could affect this species is inadvertent cutting of it during restoration thinning. Also piling material on seedlings could cause negative effects. There is some potential for invasive plant colonization as well.	Pro-active non-commercial thinning, piling of material and burning is proposed as part of a restoration strategy for this species. Extra care should be taken to ensure individual plants are protected during this work. A botanist should lay out these units with a fuels specialist to ensure mechanisms for effects are reduced to negligible.	BI	Over the past two decades botanists on the Siskiyou Mts. RD have documented continued loss of individuals of this species due to competition from lack of disturbance from fire. Part of the purpose and need for this project is to restore structure and composition that favors biodiversity. EDRR would be prioritized in and around these treatment areas to minimize collateral impacts from invasive plants.
Hill suncup (<i>Tetrapteron graciliiflorum</i> - previously known as <i>Camissonia graciliflora</i> – CAGR)	Considering the habitat where this plant grows, invasive plant competition is the main mechanism for effects to this species. The graminoid/forb dominated clay soil balds are already heavily invaded by annual non-native grasses.	Rx fire in these habitats is likely to result in short term decreases in invasive annual grasses, followed by long term increases. This species does rely on low severity fire for reproduction and to maintain habitat, so some benefit from Rx burning is anticipated.	MIIH	Due to the high likelihood of increased pressure from invasive plants in these habitats this species is at may impact rather than beneficial impact. The same EDRR PDC used with the above species should be utilized in areas where this species grows. Also, proactive native bunch grass seeding and planting in and around known populations could help abate further impacts to this plant from invasive annual grasses.

Species	Mechanism for Effects	Cause and Effect Relationship	Effects Call	Rationale
Giant death camas <i>Toxicoscordion exaltatum</i>	The sparsely vegetated areas where this plant grows naturally minimizes potential mechanisms for negative effects. Constructing fireline and subsequently trampling plants is the main potential mechanism.	Fireline construction along the saddle where this species is growing would be the main cause and effect. Implementing the PDC of no entry buffer would mitigate any potential for this.	MIIH	There is relatively low potential for effects to this species because of where it grows. A botanist should work with the fuels specialist to ensure that firelines are constructed outside of areas where this plant occurs.
Effects Call: MIIH = May adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing, NI = No Impact, BI = Beneficial Impact				

Rafinesquia californica is an annual forb of the dandelion family that inhabits open sites in scrub and woodlands, “often common after fire” (Jepson 2012). It occurs in a number of sites on proposed activity units within the Ashland RA.

The project area encompasses a very biodiverse area relative to rare plant distribution in the state of Oregon. Many of the species in the project area rely on frequent low to moderate severity fire for reproduction and habitat requirements. The purpose and need of the project addresses several of these species by promoting disturbance on the landscape. There is potential for collateral damage to these species from inadvertent actions directly trampling or uprooting individual plants or entire populations. PDC’s are outlined in previous chapters of this EA that provide mitigation from these potential impacts. The greatest ongoing threat to these species in this project area is from continued or exacerbated invasive plant spread. It is very important that during implementation of this project this factor is considered. Botanist’s, fuels specialists and interested community members should work closely together to develop prescriptions and strategies to minimize these impacts.

Considering this project is proposed within the Adaptive Management Area land allocation there is potential for monitoring effects from commercial thinning followed by prescribed burning on clustered lady slipper. This would be a good opportunity for collaboration with the local community who helped develop this project over the past several years. Ongoing monitoring and prescription adjustment for all treatments and PDC’s should be a long term goal within this AMA land allocation.

There would be no cumulative effects because the only activities that would cumulatively occur on the same acre are restoration treatments, e.g., density management, activity fuels treatments and/or maintenance prescribed burning.

b. Recreation

The Upper Applegate Watershed offers a diverse mix of recreational opportunities including developed recreation sites, motorized and non-motorized trails, fishing, hunting, berry and mushroom picking, botanizing and dispersed camping. Recreation use occurs in this area all year long and ranges from a low level of use in the winter to a moderate level of recreational use in the spring, summer and fall. In the winter the Applegate Valley is often sunny and warm while the Rogue Valley has heavy fog and is cold, which makes for a great outdoors escape.

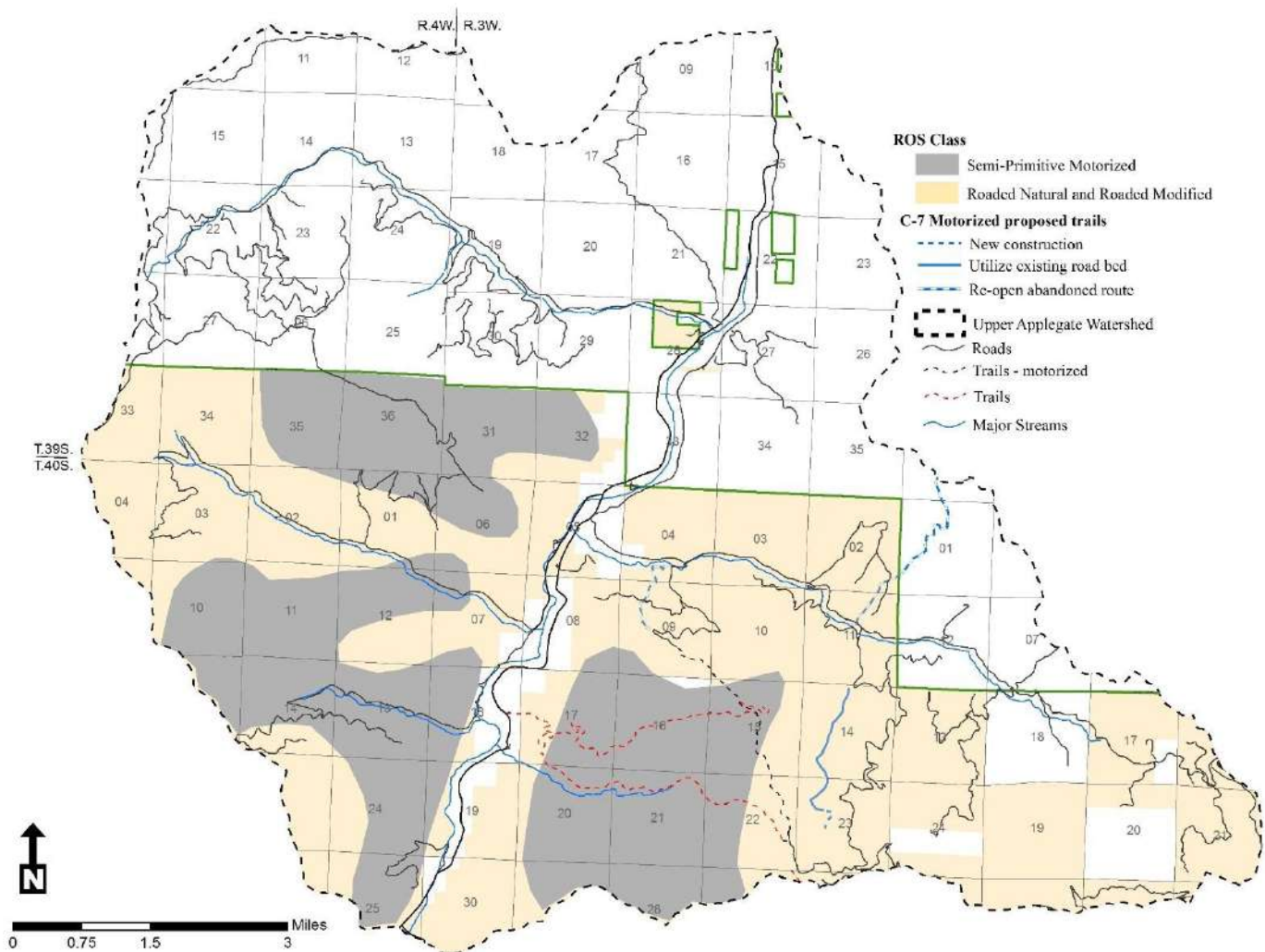
The Forest Service uses a method called the Recreation Opportunity Spectrum (ROS) to inventory and manage outdoor recreation settings and to insure that a broad mix of these settings remain available to provide the recreating public. Experiences are on a continuum and range from high challenge and remoteness (Primitive) to highly developed and managed settings found in some Forest Service recreation areas (Urban).

Under the RRNF LRMP approximately half of the Upper Applegate watershed has been assigned an ROS of Semi Primitive Motorized and half as Roaded Natural and Roaded Modified (see Figure 3-4).

A Semi Primitive Motorized ROS is characterized by a predominantly natural-appearing environment with a low concentration of use, but there is often evidence of other users. Motorized use is permitted and access is via motorized trails or primitive roads.

Similar to Semi Primitive Motorized ROS, Roaded Natural and Roaded Modified ROS classes are characterized by a predominantly natural-appearing environment, but with a moderate to heavy evidence of other users. Access is by foot, horse, mountain bike, and motor vehicle. The Upper Applegate watershed is characterized by a well-developed system of roads (generally gravel surfaced) that provides access, although some roads may be closed to specific vehicles.

Figure 3-4. Recreation Opportunity Spectrum – RRNF LRMP



Developed Recreation

Without implementation of the Proposed Action, current use is expected to remain the same with some increase in use anticipated in the future.

Operational activities associated with the Upper Applegate Watershed Restoration Project may cause some short term disruption to developed recreation activities. Some recreations activities may be curtailed to accommodate operations, i.e., temporarily closing adjacent campgrounds or trail heads until the operation activities are complete. This direct effect would degrade the recreation experience for some users who have come to expect a quiet experience with full access to authorized trails and roads. Since not all areas would be receiving treatments at the same time, most trails and roads would remain open while implementation activities occur. The proposed activities would not directly affect developed recreation sites.

Upper Applegate Road is classified as a paved county highway providing access to over 1,000 residences, Applegate Lake recreational facilities, Beaver Creek road, and numerous Forest Service roadways. Recreational traffic tends to increase during the summer season, primarily on weekends. The developed recreation sites in the Upper Applegate watershed are accessed by these roads that also serve as haul routes for commercial timber removal. A short- term indirect impact to developed recreation sites would be the combining of commercial vehicle traffic and public vehicle traffic which increases the probability of accidents. To mitigate potential accidents between log hauling and public vehicle traffic, contracts or permits would include notifying the public through signing along the roads and possible temporary road closures to public traffic, and not hauling on weekends or holidays.

Another short- term indirect impact to developed recreation sites as a result of this project would be noise from management activities. Refer to the discussion for the [Sound Disturbance](#) issue in this Chapter.

Similar to noise, burning piles and under burning could have a short-term impact to developed recreation sites due to smoke impacting the recreational experience. Refer to the discussion for [Air Quality](#) in this Chapter.

The project may indirectly affect dispersed recreation sites temporarily, due to personnel using these sites while working on contracts associated with fuel reduction treatments. This effect would be mitigated and managed, and would not result in any long-term adverse effects to the sites.

Trails

Under the 2016 Final Record of Decision for Motorized Vehicle Use on the Rogue River-Siskiyou National Forest, the Charlie Buck/ Baldy Peak trail #918, Mule Creek trail #920 and Mule Mountain trail #919 are open to Class III ATVs (motorcycles). The Mule Creek and Mule Mountain trails are currently not included on the Motor Vehicle Use Map (MVUM) due to the lack of a right of way to access the trails. Currently there are approximately 13 miles of system trails on National Forest lands in the Upper Applegate watershed. Of those, 2.8 miles allow motorized use (motorcycles).

Within the Upper Applegate watershed, there are approximately 83 miles of Forest Service system roads. Of that total, roughly 54 miles allow mixed use, including ATV's.

Under the Proposed Action, an additional 16-18 miles of non-motorized trails (on Forest Service and BLM lands) would be authorized. This would provide additional opportunities for hiking and equestrian use. The trail that would follow the abandoned Palmer Ditch would provide a north to south route connecting to Applegate Lake. The trail that follows Ladybug Gulch would provide access from Star Gulch to Tallowbox Mountain.

Approximately 5½ miles of existing abandoned roads and trails would be incorporated into the motorized trail system which would provide a desirable single track experience for motorized users and provide connectivity to existing motorized routes on BLM lands north of Cinnabar Mountain and Forest Service motorized trails south of Forest Road 20 while minimizing mixed use on paved roads. Trails would be maintained to Trail Class 2- motorcycle standards with an 8"-24" tread width, 6'-7' clearing height, and 4' clearing width.

A key component of trail sustainability is social sustainability, which is how well a trail meets user desires. Each trail user is seeking a specific experience and failure to meet trail users desires can result in overcrowded trails, trails with little use, and/or creation of unauthorized routes. This applies to both motorized and non-motorized trails. Providing highly desirable trail opportunities increases the enjoyment of public lands and the social sustainability of a trail system.

While there is an adequate road system in the Upper Applegate watershed that may be used for ATV's, there is a limited amount of single track trail opportunities. Single track trails with a narrow tread provides users with highly desirable challenges.

Proposed restoration treatment activities identified in the Proposed Action would have a short term direct impact to trail users if trails are to be closed during management activities (mechanical thinning, prescribed fire) due to safety concerns. Log landing sites may be located in proximity to established trails or roads and would preclude trail use during operations.

The primary effect to recreationists in the long-term following project activities would be a slight change in character along roads and trails where restoration activities have taken place. Currently, many of these areas are bordered by dense tree stands and downed woody material that tend to enclose or envelop the trail or road. Under the Proposed Action, these stands would be opened up through cutting and removal of generally small diameter trees along with pruning and underburning resulting in a more open forest. User reaction to this change in character is difficult to predict.

Dispersed Recreation

Impacts as a result of this project to dispersed recreation activities are similar to developed recreation sites except there would be a direct impact to certain dispersed recreation activities during management activities.

When management activities are occurring, recreationist would not be able to access some dispersed campsites that are in the Upper Applegate watershed and access to some dispersed campsites would be lost due to the blocking of unauthorized roads near the Placer Day Use site. Other activities such as hunting, and mushroom picking would be disrupted in areas where active operations are occurring.

Impacts to dispersed recreation would be mitigated and/ or reduced by including contract language requiring notification of the public. Additionally signing along roads and possible temporary road closures to public traffic would mitigate impacts. Hauling on weekends or holidays would be restricted to minimize impacts to dispersed recreation activities.

Under the current condition, there would be no restoration treatments, and therefore no mechanism to affect recreation and public safety; current conditions would continue. Public safety risks would potentially increase under major wildfire situations.

The proposed action would not change the long-term developed recreation opportunities described in the Upper Applegate watershed. Recreation and vegetation management activities have co-existed in this area previously, as evidenced by the use of landings and the use of roads constructed for timber removal as trails. Short-term effects from noise and traffic associated with all harvest operations from the UAWRP would end once the project is completed.

The only long-term impact to dispersed recreation activities would be the loss of vehicle access to the dispersed camping area near the Placer Day Use site. Otherwise, none of the activities associated with the Proposed Action would change the long-term dispersed recreation opportunities.

c. Sound Disturbance

In regard to sound, the operational aspects of implementing restoration activities and the identification of roads and trails, for motorized use could affect the public in two main ways. First, physically, sound can have detrimental effects to human hearing, possibly leading to Noise-Induced Hearing Loss (NIHL). Second, sound can become noise and impose an unfavorable effect on recreationists seeking solitude.

Sound is defined as a vibration in the air that can be heard and measured. Noise is defined as a sound that has characteristics that may irritate or annoy a listener, interfere with the listener's activity, or in some other way be distinguished as unwanted (Harrison 1980).

Currently, ambient noise from residential activities, traffic along Upper Applegate Road combined with commercial and forest resource management activities may disturb individuals year round. The severity of the disturbance from these sources is founded on the individual's values and sensitivity to environmental conditions such as noise, and could be considered minor to extremely abrasive to interfere with personal daily activities.

Sounds from motor vehicles can also have detrimental effects on non-motorized recreation users and those seeking solitude, especially on trails. Sound levels or loudness are not good predictors of annoyance because some sounds are considered intrusive even at low levels. In addition, sounds over which people feel they have no control or which are unpredictable, are considered annoying. Sounds such as motorized vehicles, deemed as annoying by many non-motorized users (hikers), distract from the quality of the recreational experience. Conflict frequently arises between those who wish to enjoy and preserve quiet areas, where natural sounds predominate, and those whom wish to use mechanized equipment in such environments (Kariel 1990).

Under the Proposed Action, additional noise from connected actions, (e.g., chainsaws, tractors, yarders, and helicopters operating in the Upper Applegate watershed), would most likely be heard by nearby residents living along Upper Applegate Road.

By limiting operating periods (depending on type of operations and distance from homes) to 7:00 a.m. to 7:00 p.m. with no operations on holidays and weekends would limit the time and day disturbance would occur. The most prominent noise disturbance would result from the use of helicopters. Topographic features may act to cause "echoing", particularly as helicopters work to lift logs off the forest floor.

Overall, noise from operations could occur seasonally up to 7-10 years, depending on funding and personnel resources and environmental conditions.

Total motorized trail mileage would increase by approximately 5½ miles. This increase would be somewhat offset with the decommissioning of an estimated three to four miles of unauthorized ATV routes. The level of sound from motorized trails use would remain similar as with current use. The main difference would be related to the location of use. The majority of noise would continue to come from traffic on the Upper Applegate Road.

There has been discussions related to lowering the legal noise requirements for off road vehicles from various members and groups within the community. This is being pursued outside of this analysis.

Physical sound from motor vehicle operation across the forest, combined with sounds of hikers, campers, aircraft overflights, logging operations, and various management activities could cumulatively add to the impacts of physical sound and/or noise. The difference in cumulative impacts between the current condition and Proposed Action cannot be quantified, but does not appear to be substantially different. The Proposed Action is not likely to create adverse cumulative noise effects considering this and other current and foreseeable activities.

d. Late-Successional Habitat

This issue is designed to focus on the effects of restoration treatments on late-successional habitat and how connectivity may be affected. The activities proposed under the UAWRP are located within the Oregon Klamath Physiographic Province. All proposed actions would occur within the Upper Applegate watershed (a 5th field watershed) on the Rogue River-Siskiyou National Forest (RR-SNF) and Medford District of the Bureau of Land Management (BLM).

Natural plant community types within the watershed are diverse. In the lower elevations Oregon white oak woodlands and grasslands, chaparral, scattered ponderosa pine, and Douglas-fir occur up to about 3,500 feet in the interior valleys. Above this, the valley is the mixed evergreen zone, dominated with Douglas-fir and madrone up to about 4,500 feet, and a mixed conifer zone on the Cascade side dominated by ponderosa pine, Douglas-fir, incense cedar, and white fir in more mesic sites. California chaparral communities can occupy large patches of the landscape, composed primarily of wedge-leaf ceanothus (*Ceanothus cuneatus*) and manzanita (*Arctostaphylos* species). Above 4,500 feet is the white fir zone, transitioning into a Shasta red-fir zone up to about 6,500 feet. The project does not propose to treat any vegetation at elevations above 5,000 feet.

Habitat

In the absence of stand-replacement wildland fire or large-scale insect and disease outbreaks, the late-successional habitat within the Upper Applegate watershed would provide suitable migration, travel, and dispersal corridors for multiple species within the Oregon Klamath Physiographic Province. The Upper Applegate watershed would continue to provide high-quality habitat for northern spotted owl, fisher (*Martes pennanti*), and other late-successional species.

Early and mid-seral stands would continue to develop into mature habitat over time. Ecosystem processes such as insect infestations and disease would continue to create decadence, mortality, and deformities in individual or groups of trees which provide diversity in stands and nesting, roosting, and foraging opportunities for many late-successional species.

Large-scale insect or disease outbreaks resulting in tree mortality over large areas could result in substantial loss of late-successional habitat and LSR function and connectivity (refer to the discussion of Insects and Disease in this chapter).

Large portions of the watershed have missed one or more fire-return intervals resulting in over-stocked stands and high fuel loading. This combined with steep topography, high summer temperatures, and the history of numerous fire starts in the area, creates the potential for large-scale high-severity wildland fire.

This could involve substantial loss of late-successional habitat, and loss of LSR function and connectivity resulting in potential temporary reduction or displacement of some late-successional species.

In the event of large-scale, high-severity wildland fire, the Oregon Klamath Physiographic Province would likely not support current densities of late-successional species. Travel and dispersal corridors from the Siskiyou and Cascade Ranges could potentially be severely disrupted depending on the juxtaposition of late-successional habitat remaining after a fire.

Proposed treatment units include NRF and dispersal habitat for northern spotted owls. The 2011 Revised Recovery Plan for the Northern Spotted Owl provides considerations and treatment guidelines when designing forest restoration projects (USDI Fish and Wildlife Service 2011b).

The primary indicator for effects on late-successional habitat is change of average forest stand conditions that are assumed to currently represent late seral conditions, i.e., stands that average 17 inches or larger in diameter, and have 60% or greater canopy closure.

Conversely, dispersal habitat that occurs in areas of high relative habitat suitability are proposed for treatments that would enhance their development into nesting, roosting, and foraging (NRF) habitat (USDI Fish and Wildlife Service 2011b).

The proposed action would treat and maintain up to 3,912 acres of NRF habitat (37%) (Table 3-5), the primary treatments are prescribed fire and using fire to maintain previously underburned NRF habitat, up to 3,457 acres of this habitat would be treated by under burning and using fire to reduce ground and ladder fuels and the primary structure and function of NRF would not be affected. These treatments are expected to May Affect, Not likely to adversely affect spotted owl NRF. Up to 661 acres of NRF would be treated with non-commercial thinning (221 acres) in unmanaged stands, thinning in managed stands (33 acres) legacy tree thinning (38 acres). All of these activities would also impact the primary structure and function of NRF would not be affected. These treatments are expected to May Affect, Not likely to adversely affect spotted owl NRF. Some commercial thinning in unmanaged stands (251 acres) would downgrade NRF habitat (120 acres), one percent of the total NRF habitat within the analysis area.

Dispersal-only habitat conditions can be highly variable but in general consist of forested stands with moderate canopy cover that are dominated by smaller, single aged trees with little if any structural features other essential habitat components for nesting or roosting. Effects to dispersal-only habitats are evaluated at a larger landscape scale due to the life history function of dispersal habitat.

The RR-SNF has determined that all proposed treatments would affect 5,849 acres of dispersal habitat (28 percent of the analysis areas dispersal-only habitat) associated with these projects. The nature of the action and the distribution of effects alone is not expected to be substantial overall and would not preclude the ability of NSO to disperse across this landscape.

In summary,

- Canopy cover in treated stands would be maintained at 40 percent; and
- Maintenance activities within dispersal would not remove the components important to owls: trees 11 inch diameter or greater, flying space, and some prey habitat. Any large, remnant standing and down dead wood would be maintained unless they are a danger along roads.
- The amount of basal area maintained would depend on site specific conditions to ensure the stand would still function as dispersal habitat.
- The proposed treatments would be dispersed throughout the Section Seven watersheds to minimize the potential for adversely affecting spotted owl dispersal.
- In addition to the dispersal habitat that would be maintained (or improved in over dense young stands), all NRF would be maintained. NRF provides high quality habitat for dispersing owls.

The proposed action would treat and maintain 1,126 acres of NRF habitat (23%) and up to 1,067 acres of dispersal only habitat(46%) from K LW-4. The proposed action would also treat and maintain 33 acres of NRF habitat (1%) and up to 1314 acres of dispersal only habitat(80%) from KLE-6, almost all of it in plantations or with prescribed fire and fuels maintenance (Table 3-5).

Table 3-5. Effects to NSO Critical Habitat from the Proposed Action

	NRF Removed (acres)	NRF Downgrade (acres)	NRF T&M (acres)	Dispersal-Only Removed (acres)	Dispersal-Only T&M (acres)	Total Habitat Acres Treated
KLW-4 (baseline acres)	4,799			2,319		
All treatments			1,126		1,067	2,153
KLE-6	2,763			1,629		
			333		1,314	1,647
% Change to KLW-2 Baseline Habitat	0	0	No Change	0	No Change	

The effects of all vegetation treatments within the two CHUs for spotted owls is “**May Affect, not likely to Adversely Affect**” designated spotted owl critical habitat.

Connectivity

Recent definitions reflect a broadened understanding of habitat corridors, which are now described as components of the landscape that facilitate the movement of organisms and processes between areas of intact habitat. Implicit in this definition are two ideas: (1) corridors support the movement of both biotic processes (e.g. animal movement, plant propagation, genetic exchange) and abiotic processes (water, energy, materials); and (2) corridors are process- or species-specific (Jongman & Pungetti 2004). To help clarify the terminology on corridors that support biotic processes, Jongman and Pungetti (2004) distinguish between three different types:

- Migration corridors are used by wildlife for annual migratory movements between source areas (e.g. winter and summer habitat). An example of a migration corridor is the Path of the Pronghorn in Wyoming.
- Dispersal corridors are used for one-way movements of individuals or populations from one resource area to another. Dispersal is critical to the maintenance of genetic diversity within populations of species and to the persistence of fragmented populations which may require regular immigration to avoid local extinction.
- Commuting corridors link resource elements of species’ home ranges to support daily movements including breeding, resting and foraging. As such, commuting corridors facilitate localized movements throughout the landscape important to daily survival and reproduction.

Although the term ‘linkage’ is frequently used synonymously with corridor, ‘linkage’ technically refers to broader regions of connectivity important to facilitate the movement of multiple species and maintain ecological processes. For the UAWRP, three species are used to analyze connectivity, both within the watershed and linkages to other watershed and landscapes outside the Upper Applegate watershed. Three species that are associated with canopy cover and structure are used here to discuss connectivity; the northern spotted owl, fisher, and the Siskiyou Mountain salamander. All require certain habitat characteristic to facilitate connectivity though owls and fisher are more mobile, while for the Siskiyou Mountain salamander, little is known or to what degree connectivity is needed for this species.

The **northern spotted owl** is considered to need at least a minimum of 50 percent on the landscape in a condition sufficient to facilitate dispersal between and within populations. It is referred to as the '50-11-40' rule.

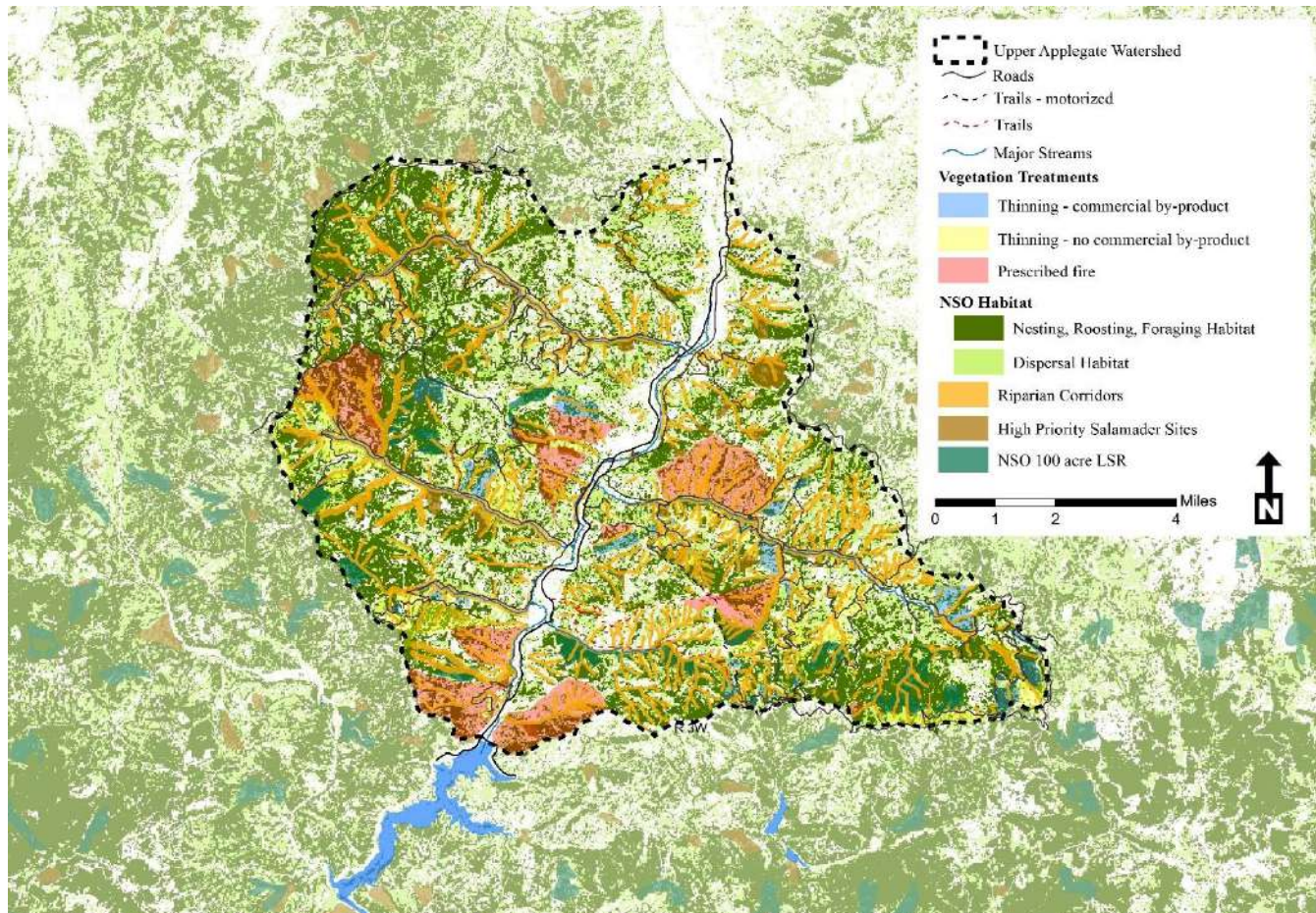
In general, the landscape should have at least 50 percent of its conifer dominated landscape with a minimum of canopy cover of at least 40 percent canopy cover with a minimum of 11 inch DBH (diameter at breast height) trees. Currently, within the Upper Applegate watershed, 68 percent of the area provides dispersal habitat in the form of dispersal-only and NRF habitat. However, there are also other non-conifer dominated stands of oak and pine that can act as dispersal habitat and may also facilitate dispersal by northern spotted owls. No treatments or proposed activities in the Proposed Action would reduce dispersal habitat. Therefore, the Proposed Action would not affect spotted owl dispersal across the planning or larger landscape.

The **fisher** is considered to use a wide variety of habitats for foraging and dispersal (Clayton Personal Obs.). Currently within the UAWRP, 68 percent of the area is provides dispersal habitat for northern spotted owls in the form of dispersal-only and NRF habitat. Fisher can easily use this habitat to disperse through and across the landscape. In addition, there are also other non-conifer dominated stands of chaparral, oak and pine habitats that are used as forage habitat by fisher and that may also facilitate dispersal by fisher (Clayton Personal Obs.). No treatments or proposed activities would reduce any dispersal habitat. However there would be up to 120 acres of NRF habitat within the Proposed Action that may be reduced to below 60 percent canopy cover. Fisher may avoid for this area for some time until the canopy cover returns. However in a recent study in the Ashland watershed (Tessa Smith Utah State, in review), canopy cover was not a significant variable in habitat use or den sites. This could be due to the general lack of treatments in the study area that reduced canopy cover to below 60 percent. Otherwise fisher used all types of habitats for denning and foraging including those that has been treated both commercially and non-commercially. Units in UAWRP are widely spaced across the watershed and would not likely provide a barrier to fisher dispersal. The Proposed Action should not affect fisher dispersal across the planning or larger landscape.

Little is known about the dispersal needs or ecology of the **Siskiyou Mountain salamander**. Populations are typically scattered rather as disjunct populations across the landscape as are their habitats: deep rocky soils with high amounts of canopy cover. Plethodontid salamanders are known to have very small home ranges (<2 meters) and occur in high abundance in suitable habitats. It is unknown if they will disperse to other populations. Genetic analysis of this species in the Applegate show that these populations are almost identical at the cellular level and likely a result of a founder effects sometime during the Pleistocene era (Clayton Pers comm), then possibly a subsequent retraction of their range into these small disjunct populations.

However, habitat modelling show that their habitats are widespread in the area of the Proposed Action and there is the possibility that they can and do disperse from sub-population to sub-population. All activities under the Proposed Action will follow the conservation strategy for this species and should not result in direct effects to population or the potential for dispersal form population to population.

Figure 3-4. Connectivity for the Upper Applegate Watershed



e. Inventoried Roadless Areas

Controversy over roadless areas has been in public debate for decades. Areas without roads often provide outstanding dispersed recreation opportunities, such as hiking, camping, picnicking, wildlife viewing, hunting, fishing and botanizing. While they may have many wilderness-like attributes, unlike Wilderness areas, the use of mechanized and motorized travel is often allowed. These areas can also take pressure off heavily used wilderness areas by providing additional solitude, quiet, and dispersed recreation opportunities.

Within the Upper Applegate Watershed there are two Inventoried Roadless Areas (IRA's) on National Forest Lands and a District Designated Reserve on BLM lands (identified as Lands with Wilderness Characteristics - LWC). Forest Service policy (Forest Service Handbook 1909.12) requires the agency to address potential wilderness areas (PWA) on National Forest lands.

Additionally, there are other areas within the Upper Applegate watershed that do not have roads and have characteristics similar to inventoried roadless areas. There is an opportunity and obligation under NEPA to respond to these public identified areas received during scoping for this project. For this analysis, they are referred to as semi-primitive unroaded areas.

Inventoried Roadless Areas (IRA's)

Inventoried Roadless areas, like Wilderness, are valued by many for their very existence in an undeveloped state. This value is experienced practically by users of the area, and intrinsically by those who place value in simply knowing that undeveloped lands, perceived as “wild,” still exist.

The Kinney and Little Grayback Inventoried Roadless Areas are located entirely on lands administered by the Rogue River–Siskiyou National Forest. Neither Inventoried Roadless Area is adjacent to, contiguous to, or near any designated Wilderness area.

The Kinney Creek IRA is in total, approximately 7,790 acres in size of which 4,570 acres fall within the Upper Applegate watershed. This IRA lies on the west side of the Applegate River and includes portions of the Palmer and Kinney Creek drainages. The area outside of the Upper Applegate watershed borders the southwest side of the Upper Applegate watershed. The Little Grayback Inventoried Roadless Areas is located east of the Applegate River and includes approximately 7,500 acres with 4,150 acres within the Upper Applegate watershed. The remaining area borders the southern edge of the watershed.

Without implementation of the Proposed Action, there would be no change to the current conditions within the IRA's. Current uses would be continued. Risk to disturbances from fire and insect and disease would remain the same (refer to discussion on Attainment of Purpose and Need).

Although approximately 5,410 acres are proposed for some form restoration treatment under the Proposed Action within the Kinney and Little Grayback IRA's, this is an upper threshold of extent used for analysis purposes. The proposed treatments in the IRA's include prescribed fire and some thinning (with no restoration by-product) along some strategic areas. No commercial removal of material would occur in the IRA's. Prescribed fire would be the primary tool used in the IRA's. An estimated 230 acres would be thinned with the treatments focused on surface and ladder fuel reduction along the ridge on the south side of the Kinney Creek drainage.

Under the Proposed Action, there would be no effect to roadless character resultant of new roads or landings as none would be constructed within the Inventoried Roadless Areas.

Proposed management actions such as density management and prescribed fire would not alter the natural appearance or visual variety from a landscape perspective, but would be evident from a foreground perspective. During operations, opportunities for solitude and primitive recreation would be diminished due to increased noise and presence of equipment and forest workers.

The proposed management actions may affect the existing character for those who feel it should remain undeveloped as to eliminate all evidence of human disturbance. Logging and mechanical brush treatments would affect the undisturbed appearance, most evident alongside existing trails and bordering roadways.

The Proposed Action is not predicted to affect outstanding attractions, vista points, scenic backdrops or overall roadless natural appearing landscape characteristics. Therefore, the proposed action is not predicted to directly affect the potential for either Kinney or Little Grayback Inventoried Roadless Area from future Wilderness designation. The Proposed Action would reduce fire hazards to increase the probability of protecting roadless features and integrity in the event of a future wildfire.

Cumulative effects associated with the Proposed Action would not adversely affect the character and potential of Kinney or Little Grayback Inventoried Roadless Areas for future Wilderness designation. The implementation of fuels reduction activities would affect short-term characteristics as stated under the direct effects.

Lands with Wilderness Characteristics (LWC)

Lands with wilderness characteristics retain a primeval character, without permanent improvements and generally appear to have been affected primarily by the forces of nature. These lands provide a variety of resource benefits, including wildlife habitat, clean water, and primitive recreation opportunities.

The BLM's Resource Management Plan includes prescriptive management direction to meet the Management Objective to protect wilderness characteristics (i.e. roadlessness, naturalness, opportunities for solitude and primitive unconfined recreation, and identified supplemental values), while allowing competing resource demands that do not conflict with preserving long-term wilderness characteristics.

The RMP allows trail construction and maintenance, fuels treatments, invasive species management, riparian or wildlife habitat improvements, forest management, and other vegetation management only if any reductions in wilderness characteristics are temporary and wilderness characteristics are protected over the long term.

This area is referred to as the Burton-Ninemile LWC.

The Burton-Ninemile LWC totals approximately 5,933 acres of which 3,654 acres fall within the Upper Applegate watershed. Areas outside of the watershed lie to the north and west.

The Proposed Action is not predicted to affect outstanding attractions, vista points, scenic backdrops or overall roadless natural appearing landscape characteristics. The only treatments proposed are fuels maintenance (985 acres). The Proposed Action would reduce fire hazards to increase the probability of protecting roadless features and integrity in the event of a future wildfire.

Unroaded Areas

The Upper Applegate Watershed contains several areas that possess some unroaded character and values not included as IRA's or LWC. This sub-section documents the criteria used to identify unroaded areas for this analysis. This process does attempt to reflect the concerns and values expressed during scoping. Furthermore, it is not meant to satisfy any one particular set of values as received from any one person or organization.

For the Upper Applegate Watershed, the criteria used to identify unroaded areas includes:

Size: The criteria for size of area incorporates similar parameters as the national roadless policy, namely: 1,000 acres or larger for any one individual area, non-contiguous to any other area; or any reasonable size when contiguous to existing IRA's. "Reasonable" is further defined as having habitat value and character; a criterion of 500 feet was used to define any area in width at its narrowest point.

Roads and distance from roads: Each area shall not include any managed or unmanaged, "classified" or "system" road currently on the Forest Service or BLM transportation system. A "road" is defined as a motor vehicle travelway over 50 inches wide and includes Forest Service and BLM roads, State roads, County roads, private roads, and other permitted roads.

Vegetation condition: Based on average natural stand conditions, stands should be at or near to late seral stage or late-successional habitat conditions for the sub-watershed (i.e., for a given site). For the Upper Applegate Watershed, this has been determined to be stands ages of approximately 120 – 140 years or more. Vegetative areas can also include contiguous natural, non-forested or sparse vegetation types and plant communities, e.g., meadows.

Degree of past management: Areas should be relatively un-entered and un-managed; minimal past salvage activity would be acceptable. Areas would not include any areas that were managed as regeneration is the last 100 years (e.g., clear-cut or shelterwood silvicultural treatments).

As shown on **Figure 3-5**, there are four areas identified that meet the mapping criteria described above. Because they are for analysis purposes only, they are labeled A, B, C, and D.

Direct effects include restoration treatments (density management, surface and ladder fuel treatments, prescribed burning, etc.), occurring in areas identified through GIS analysis utilizing the above described process. Figure 3-4 portrays the unroaded areas based on the criteria described above. The following discussion includes the extent or area of effect (change) to these areas.

Table 3-6. Effects to Other Unroaded Areas

Unroaded Area	Total Acres	Acres Treated Proposed Action	Percent of Total Area Treated	Acres of Density Management	Acres of Prescribed Fire
A	1,850	896	48%	71	825
B	342 ¹	3	1%	1	2
C	1,070	247	23%	140	107
D	3,010	1,585	53%	15	1,570

¹ Although less than 1,000 acres, this area is adjacent to the Little Grayback IRA.

Although no new roads or landings would be constructed, management actions such as density management and prescribed fire are proposed. These actions would not be overly evident from a landscape or overhead view but would be visible to persons walking through areas where treatments occurred.

The proposed management actions may affect the existing character for those who feel it should remain undeveloped and show no evidence of human disturbance. There would be no change to late-successional habitat or late seral vegetation conditions. Some stumps and evidence of management may be evident.

The ecological effects of fragmentation and late-successional forest connectivity would be minimal with these types of treatments and the resulting reduction in fire hazard and risk and increase in resilience may further protect the integrity of these unroaded areas.

The only activities that would cumulatively occur on the same acre are restoration reduction treatments, e.g., density management, activity fuels treatments and/or maintenance prescribed burning.

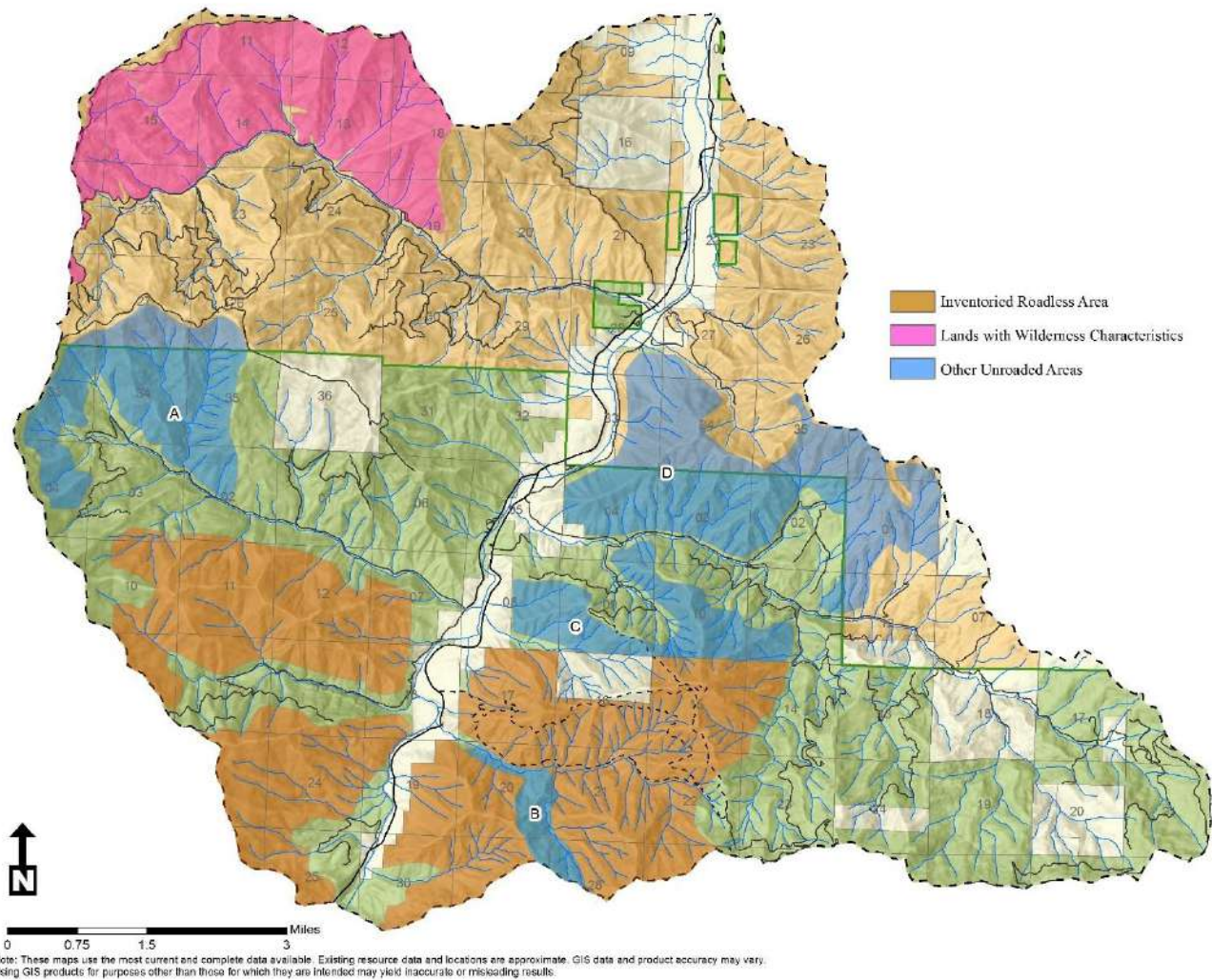
As with the IRA, ecosystem function is not a product of specifically designated boundaries. Specific ecological effects of fragmentation and late-successional forest connectivity are discussed in more detail in the Late-Successional Habitat issue, this chapter.

Potential Wilderness Areas (PWA)

Potential wilderness areas do not reflect a land designation decision, do not imply or impart any particular level of management direction or protection, are not an evaluation of potential wilderness, and are not preliminary administrative recommendations for wilderness designation. The inventory of PWAs does not change the administrative boundary of any IRA or any congressionally designated Wilderness areas.

PWA inventories typically occur during a forest plan revision. When the Rogue River-Siskiyou National forest conducts forest plan revision, an inventory of PWA would be conducted at that time. Currently, there are no known identified PWAs within the Upper Applegate watershed.

Figure 3-5. Inventoried Roadless Areas, Lands with Wilderness Characteristics, and Other Unroaded Areas



f. Sediment Delivery

Sediment delivery is the indirect result of the amount of sheet erosion and ravel moving into unstable zones, the percent of effective ground cover, the number and size of landslides, root strength, and slope features. The actual amount of sediment delivered to a stream channel is related to all of these features and is dependent the magnitude and timing of climatic events, which is the driving force. Standards which govern the proposed operations can control the amount of ground disturbance relative to the physical features, but cannot control the weather. The Rogue River National Forest LRMP Standards and Guidelines for the amount and location of ground disturbance are believed to be sufficient to control sediment delivery at a level that is below levels that would produce adverse resource damage.

Fire can adversely affect the physical and biological composition of soil. Soil burn severity is a qualitative term that describes classes of fire-caused changes to soil hydrologic function. The classes are identified by soil characteristics and surface fuel and duff consumption following fire and incorporate residence time. The resultant classes are Unburned to Very Low soil burn severity, Low soil burn severity, Moderate soil burn severity, and High soil burn severity.

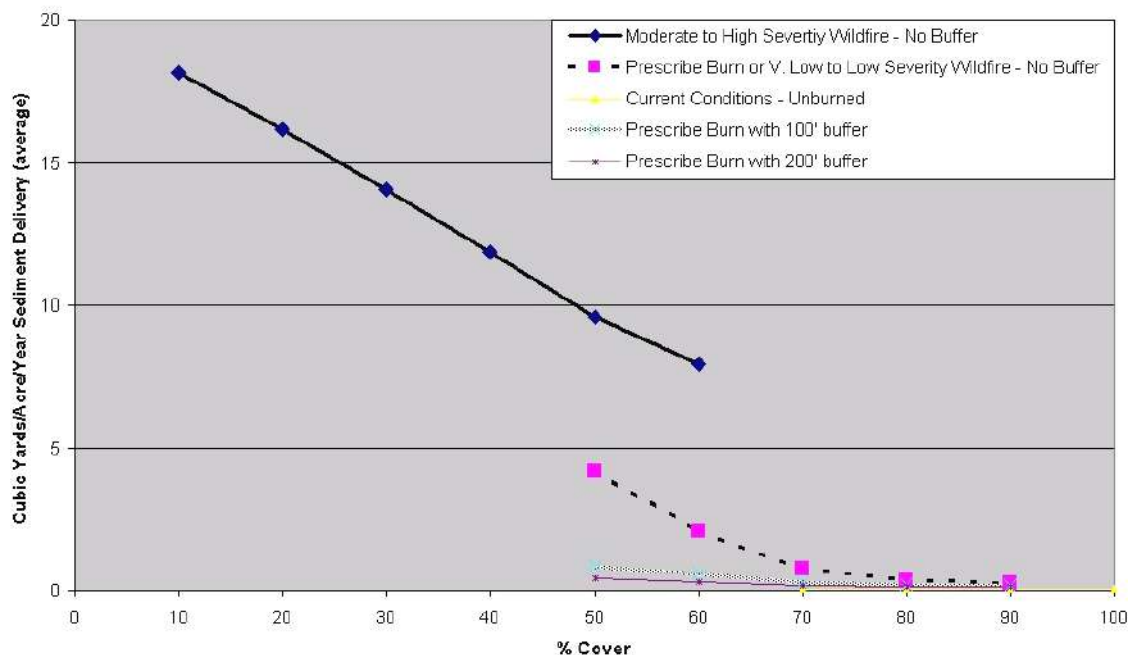
In general terms, the higher the temperatures and the longer the residence time associated with the fire, the greater the effects. With increasing soil burn severities, soil erosion and resultant sedimentation would increase. Without vegetation and intact duff layers to moderate conditions, runoff rates would increase. The presence of water repellent soils would further increase runoff rates, which would facilitate increased erosion and sedimentation.

Once sediment is delivered to stream channels, it would become entrained in the system and move down-channel in relation to stream flows. Sediment will hardly move at all during low flows and will move in great quantities during high flow or flood events. The stream channels have a complex morphology. Generally, the channels have steeper gradients toward the upper ends of the drainages. The gradient becomes progressively gentler the lower one goes in the drainage. The effects of channel morphology on sediment movement have been described by Montgomery and Buffington (1993) in the general terms of source, transport, and response.

With the current fuel loading conditions, a wildland fire would likely leave a large portion of the area in the moderate and high soil burn severity categories. When wildland fires burn, there is no control over burn severity. The Quartz Fire, which burned over 6,000 acres immediately northeast of the Upper Applegate watershed, had 41% of the burned area in the severe soil burn severity, and 35% in the moderate soil burn severity categories.

The greatest increase in sediment from surface erosion sources would occur during the first and second years after large-scale wildland fire. As soil cover increases through plant re-establishment, needle and leaf cast from standing dead or live trees, and armoring of the soil surface, erosion and sediment rates should decline. Figure 3-5 shows the relationship of soil cover to sedimentation and why it is important to maintain soil cover near stream channels.

Figure 3-6. Predicted Erosion Rates Using WEPP



The activities proposed in the Proposed Action are designed to reduce fire hazards by managing the density of vegetation and surface fuels in selected areas. Each of the proposed treatment methods, whether prescribed fire or density management, would be appropriate for the land and conditions where applied. With each project type, land managers would have control over the exact area where the treatment would be applied, and the conditions under which the application would occur. For instance, in the case of prescribed fire, activities can happen at a time when fuel moisture is high. The prescribed burn areas would have fire lines surrounding them, and crews on-site to manage the fire. The resultant burn severity would be mostly in the low category.

All trails proposed under the Proposed Action are designed to reuse existing upland roadbeds, mining ditches, or previously abandoned trail routes, except where two short re-routes are needed on the Charlie Buck motorized trail proposal. Based on project design criteria and mitigation measures regarding sustainable trail design and erosion control features, and the known effectiveness of adjacent organic matter in capturing and preventing off trail movement of trail tread erosion, it is expected there would be little surface soil erosion, which would be localized to the trail tread.

Mitigation measures prescribed in the form of Best Management Practices are designed to protect water quality. Buffers of intact vegetation and duff layers would separate the treatment areas from stream courses. These areas would trap eroded soil before it moved down slope into a stream channel. The resultant sediment yield would be much less than the yield following a wildland fire and would be just slightly more than under the current condition. There should be no measurable change in sediment yields in the streams as a result of surface erosion following implementation of activities associated with the Proposed Action.

An indirect effect of a large high severity wildland fire would be an increase in water yield. This would be a result of lower infiltration rates on the burned-over land, from decreased interception of precipitation on leaves and needles of vegetation, and from less transpiration. The increased runoff would partially be realized as increased summer flows. It is doubtful that this benefit would offset the other adverse effects and costs of having a large area of the Upper Applegate watershed damaged by fire.

The activities under the Proposed Action would have no, or minor adverse effects on sedimentation affecting water quality in watershed streams. Controls on location and timing of activities, slope, size of riparian buffers, amount of disturbance, prescribed burn intensities, etc. would mitigate the amount of erosion and sediment attributable to the project. The minor change in erosion and sedimentation would not accumulate with effects from other activities to the point where cumulatively, there would be an adverse effect.

g. Old and Large Trees

Whether or not to cut and/or remove old and large trees is one of the more important issues that is debated for projects that are designed restore resilient stand conditions and to reduce hazardous fuels. Some people want policies that prohibit any removal of trees over a specified diameter. Scientists however, point out that such a blanket policy could have substantial consequences on attainment of the desired functions of stands.

For the UAWRP, the Northwest Forest Plan (NWFP) provides direction on Forest Service lands to maintain, or contribute toward the restoration of, the structure and composition of old-growth stands. For this analysis, old-growth is defined as late-successional habitat, as described by the NWFP.

For this project, vegetation treatments focus largely on thinning small-diameter trees and prescribed fire and would maximize the retention of large trees, as appropriate for the forest type, to the extent that the large trees promote resilient stands. Treatments prescribe the retention of large, fire-resilient trees (generally sun tolerant tree species adapted to fire processes) to the degree this practice is feasible and allows for safe operations.

Large trees of selected species that are not adapted to fire processes may need to be removed to promote greater stand resiliency. Similarly, the removal of small- to mid-sized trees would generally be needed to reduce competition within the treatment area, providing for more resilient stand conditions and curtailing uncharacteristically severe wildland fire effects and enabling use of prescribed fire.

Treatments that directly affect old-growth are discussed under the late-successional habitat Relevant Issue. Amenity values associated with old-growth forest are tied to the discussion on Inventoried Roadless Area and unroaded character. These discussions are found elsewhere in this chapter.

The discussion of effects for this issue (large trees) is focused on the quantities of large trees by size class. A “large” tree is somewhat a value judgment and difficult to define.

For this analysis, two size classes are used to identify large trees. These classes are 17 to 21 inches in diameter, and greater than 21 inches in diameter. Estimates for the number of trees cut per acre by size class are based on modeling satellite imagery and from experience with similar projects. These estimates are intended to provide a rough indication of quantity for comparison purposes.

The exact quantity of large trees to be cut under the Proposed Action would ultimately be determined by field verification of the treatment criteria and tracked during implementation monitoring. Refer to the Project Design Criteria in Chapter 2 related to large trees.

If the Proposed Action is not implemented, there would be no restoration treatments, therefore no large trees or old-growth forest would be cut. If no large-scale high-severity fire were to occur within the Upper Applegate watershed, the numbers of large trees would slowly increase to some point where mortality related to over-density would occur. In the event of a wildland fire, there is the potential to lose portions of the large tree component due to a high-severity fire. The actual extent of this loss is unknown and is not able to be accurately predicted.

As a result of not cutting any large trees, there would be no indirect adverse effect from restoration treatments. The indirect effects on large trees from continued density and from potential large-scale high-severity wildland fire is discussed in other Relevant Issues. If large trees were not cut, the ecological sustainability value (protection of legacy trees) would not be obtained.

Variable density management under the Proposed Action would include “thinning from below” so the mean diameter of the residual stand after treatment would likely be greater than the current mean tree diameter for the stand prior to treatment. As large trees with thick bark are more resilient to fire than smaller trees with thin bark, prescribed fire treatments would maintain the retention of larger tree classes.

As less than one percent of the previously managed stands proposed for treatment contain large trees greater than 21 inches in diameter, variable density management under the Proposed Action would retain all such trees. Some trees between 17 to 21 inches in diameter could be removed. However, removal would only occur in cases where such trees are infected, infested or would die within 1 year and are growing in a cluster of surrounding healthy large trees. In this instance, if the tree in this diameter class is determined to create a risk to the survival of surrounding larger trees, would it be felled and removed. It is predicted 0.02 percent of trees in this size class would be removed, resulting in a minor effect.

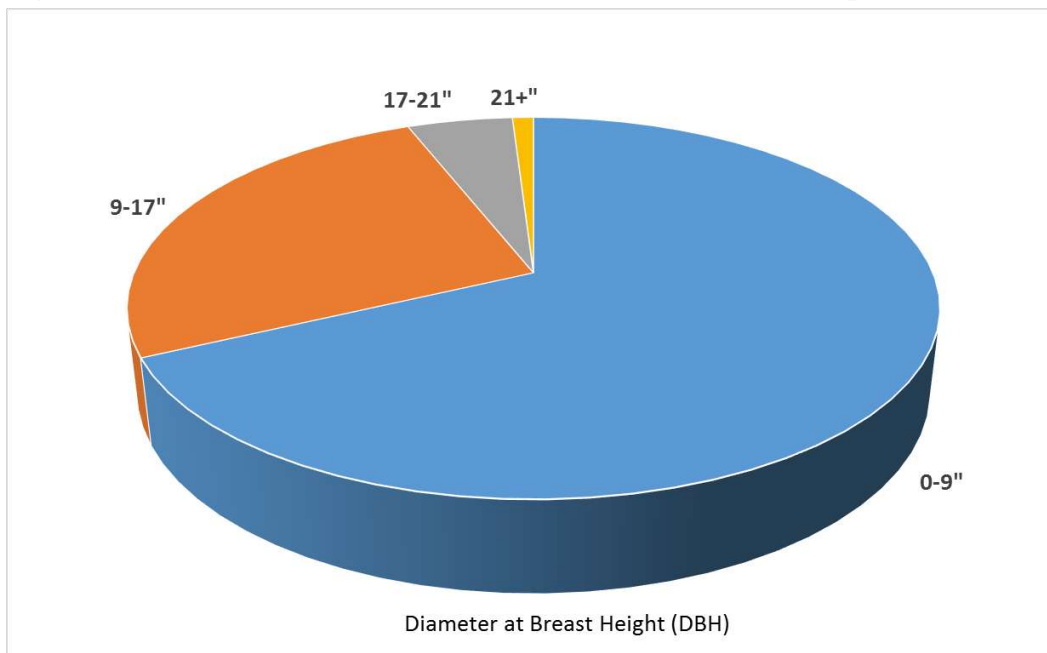
The following table displays an estimate of the number of large trees that would need to cut to achieve the resilience objectives. A range is shown because an exact number is difficult to estimate. As mentioned previously, these estimates are based on monitoring of projects with similar objectives and by modeling satellite imagery and are intended to provide a rough extent for comparison purposes. Once density targets, snag recruitment, down wood, and soil management objectives are satisfied, felled trees are considered excess to restoration objectives, and are available for removal.

Table 3-7. Estimate of Large Trees per Acre to be Cut – Proposed Action

Component	Estimated Trees per Acre to be Cut or Fire Killed	
	17-21" DBH	> 21" DBH
Legacy Tree thinning	3-5	0-2
Natural Stand thinning	2-4	0-2
Previously managed stand thinning	0-2	0-1
Prescribed burning	0-1	0-1
Landings	2-4	0-2

Density management treatments (legacy tree thinning, natural stand thinning, and previously managed stand thinning) would occur on approximately 1,520 acres, where large trees could be cut. Prescribed burning is proposed as an initial entry on approximately 4,910 acres. All of the treatments areas would be followed by maintenance burning. This would occur generally 3 to 8 years following completion of the initial treatment and then on a regular interval mimicking the natural fire return interval.

Figure 3-7. Estimated Distribution of Cut Trees by Size Class – Proposed Action



Under the Proposed Action, the cutting of large trees would directly and indirectly lead toward meeting the restoration objectives. Large trees often provide the greatest competition to conservation of legacy trees, however if some larger trees were not cut, the ecological sustainability value (protection of legacy trees) would not be obtained. The amenity values of late-successional or old-growth forest would be changed to some degree as discussed in other Relevant Issues.

There would be no cumulative effects because the only activities that would cumulatively occur on the same acre are restoration treatments, e.g., density management, activity fuels treatments and/or maintenance prescribed burning.

Cumulatively, the Proposed Action would add to the loss of large trees, estimated to be less than 1 percent of the total of large trees, some of which have previously either been removed through human management of timber, road or trail construction or have died as a result of insect, disease, drought or maturation.

Inversely, in the long-term, the potential for large tree development would be increased as tree growth would be accelerated with the reduction in environmental stress. Lower stand densities would make available more nutrients, light, and water to support individuals, particularly the initial ~5 years after implementation.

h. Soil and Site Productivity

The soils in the Upper Applegate watershed have been weathering from highly deformed and metamorphosed volcanic and sedimentary rocks of the Applegate Group, Klamath Geologic Province (DOGAMI Geologic Compilation V5).

These soils tend to be loams and silt loams, and typically have a high gravel or cobble content. South facing aspects in particular tend to have slopes with particularly shallow soils and exposed rock outcrop. Several areas of younger, granitic intrusions have been exposed during mountain uplift, providing coarser textured and less cohesive sandy soils, particularly in the upper end of the Beaver Creek sub-watershed, as well as an area to the west of the Applegate River between Star Gulch and Palmer Creek.

Under the Proposed Action, activities that can have an effect on the soil resource include: road restoration, unauthorized OHV trail decommissioning, use of heavy equipment for vegetation treatments, slash pile burning (hand piles or machine piles), prescribed fire, and non-motorized and motorized single-track trail construction and use. Some of these are beneficial effects, and some have the potential to result in short-term and/or long-term negative effects. Project design criteria and mitigation measures planned for this project and outlined in Chapter 2 are designed to minimize negative effects to the soil resource to meet Rogue River National Forest LRMP standards and guidelines.

The following effects are related to erosion which is related to one of the important relevant issues, sediment delivery. Other effects related to combustion, compaction and puddling, and organic matter are included in the Analysis of Effects – Upper Applegate Watershed Restoration Project.

Mitigation measures have been specifically designed to mitigate impacts from harvest systems to minimize soil movement, and no soil movement is expected to extend beyond vegetation treatment units due to effective ground cover requirements, erosion control measures and project design, such as riparian reserve buffers that are known to be effective in preventing erosion that could otherwise result in sedimentation into stream channels.

Prescribed fire treatments proposed in the Upper Applegate watershed would be designed to mimic historical fire return intervals and help maintain ecosystem conditions that would be consistent with low-mixed severity, fuel limited fire regimes.

The majority of the prescribed fire areas would result in a mosaic of low severity and unburned areas, with small pockets of moderate severity that would create openings in forested or brushy stands. Low-mixed severity fire results in the preservation of enough effective ground cover (i.e. duff, litter, woody debris, and litter cast from overstory vegetation) to prevent, or greatly minimize soil erosion to localized areas where soil movement from pockets of exposed mineral soil is quickly intercepted by micro-topography and adjacent intact litter.

The burning of individual hand and machine piles results in areas of bared soil due to the consumption of all organic material, as well as potentially causing isolated areas of more easily erodible soils due to loss of soil structure from combustion effects. Any sheet or rill erosion that may occur within these burn scars is quickly intercepted by micro topography and the residual unburned ring of woody debris that is common around pile burn scars, as well as the surrounding residual woody debris and natural litter immediately adjacent to the burn scars.

Sustainable non-motorized and motorized trails that meet Forest Service Trails Management Handbook (FSH 2309.18) policy and guidance result in little to no surface soil erosion due to their location, design and frequently maintained erosion control structures. Non-motorized trails would be maintained at a 12" to 24" trail tread width, and motorized single-track trails would be maintained at 8" to 24" trail tread width, which would be the expected area of bared soil susceptible to erosion.

All trails are planned to reuse existing upland roadbeds, mining ditches, or previously abandoned trail routes, except where two re-routes are needed on the Charlie Buck motorized trail proposal to meet sustainable trail design, as well as a sustainably designed motorized connector trail between Forest Roads 2010200 and 2010300.

Based on project design criteria and mitigation measures regarding sustainable trail design and erosion control features, and the known effectiveness of adjacent organic matter in capturing and preventing off trail movement of trail tread erosion, it is expected there would be little surface soil erosion, which would be localized to the trail tread.

The proposed motorized single-track trail is located on the decommissioned FS Road 2010200 (Hanley Gulch Road), which has an intact roadbed, has six drainage crossings that have had the original side-stream crossings removed and restored. This roadbed was field reviewed in July of 2018. The roadbed has regularly spaced rolling dips that have been effective in reducing and eliminating road surface sheet-wash and rill erosion as vegetation and litter layers have become established on the roadbed. In the few locations where there was evidence of roadbed soil movement being intercepted at rolling dips, soil movement was immediately intercepted either in the rolling dip or immediately off the shoulder in the forest litter layer. At the six drainage crossing locations that had the culverts removed, no evidence of erosion was observed.

Establishment of a single-track motorized trail tread on the decommissioned road prism, not including the six drainage crossing locations, with proper erosion control features and maintenance would be expected to function as a sustainable trail that would result in little surface soil erosion which would be quickly captured by trail design features and adjacent vegetation and litter/duff. Any soil movement off the trail tread would not be expected to reach Hanley Gulch below the roadbed due to micro topography, including naturally gravelly/rocky soils, downed wood, and heavy litter/duff on the slopes between the roadbed and Hanley Gulch. In addition, seasonal use restrictions for operation during the dry season would also minimize erosion potential.

At the six drainage crossings, which are tributaries to Hanley Gulch, there could be the potential for soil erosion off of the trail tread directly into these tributary drainages, depending on channel crossing design. Based on field review at each location, ford crossings would not be able to be designed to guarantee no erosion from loosened trail tread that would reach these drainages and result in sedimentation, due to the steepness of the approaches and the erodibility of the native soils at those gradients. Beaver Creek and its tributaries is a water quality limited stream for sediment. Culvert crossings along Hanley Gulch were removed in 2010-2011 to be in compliance with the Federal Clean Water Act for reducing sediment in this sub-watershed.

Furthermore, monitoring results from Wolman pebble counts show a slight decrease in fine sediment between 1998 and 2013. Therefore, re-installation of culvert crossings is not a feasible option. Instead, a trail bridge design at each crossing is proposed as a project design feature for this trail system, as the most feasible option for guaranteeing the prevention of any erosion from trail tread use reaching their respective drainages. A trail bridge design for each crossing would be the best option for guaranteeing the prevention of any erosion from trail tread use reaching their respective drainages.

Past actions in the Upper Applegate watershed that still have the potential for residual effects to soils include past timber management and wildfires. The 2017 Burnt Peak wildfire is within the Upper Applegate watershed between Palmer and Kinney Creeks. Detrimental effects from this fire would be primarily the loss or reduction of surface organic matter that provides nutrients, water retention, and effective ground cover from erosion on high severity sites. No proposed treatments that would have the potential for any negative direct or indirect effects would intersect these high severity areas of the fire and result in cumulative effects.

The Rogue River National Forest Land and Resource Management Plan establishes that the total area of detrimental soil conditions should not exceed 10 percent of the total acreage within the activity area, not including the permanent road system. The cumulative detrimental effect to soils from other actions must not exceed 20 percent. Where an area already exceeds 20 percent from prior activities, the Region 6 Manual requires that “the cumulative detrimental effects of project implementation and restoration must, at a minimum, not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality” (USFS 1998). During preparation for implementation, treatment methods are designed to assure that soil detrimental disturbance would not exceed these Standards and Guidelines. In areas where there are residual past effects, then the re-use of old disturbance areas to the maximum extent possible helps to prevent an increase in the acres. In addition, required mitigation measures to improve effective ground cover and water infiltration, such as through slash placement and subsoiling, improve the disturbed areas and set the soil resource on a trajectory of restored soil productivity.

i. Hydrologic Function

The landscape within the Upper Applegate watershed is highly dissected characterized by numerous streams and draws. The Upper Applegate Watershed Restoration Project is located within three 6th field sub-watersheds in the Applegate Sub-basin.

Table 3-8. Upper Applegate Sub-watersheds

Sub-Watershed	Total Acres	Stream Density (mi./sq. mi.)	Open Road Density (mi./sq. mi.)
Beaver	17,504	2.94	1.93
Palmer	18,684	4.26	2.18
Star Gulch	16,113	4.60	1.44

As part of the Water Quality Restoration Plan (USDA 2005), road decommissioning was completed during 2010-2011. The road density in the Applegate River – Beaver Creek sub-watershed has been reduced from approximately 3.22 mi per square mile for Forest Service system roads to 1.93 miles of road per square mile. For the UAWRP area (5th field HUC), road density is currently at 1.87 miles of road per square mile.

Several streams in the Upper Applegate watershed were considered water quality limited by the Oregon Department of Environmental Quality (ODEQ) and were placed on the 303(d) list in 1998. Table 3-9 identifies the streams, the parameters for which they were listed, and the section of stream listed (river mile). In 2003, a Total Maximum Daily Load (TMDL) and associated Water Quality Management Plan (WQMP) was developed. The WQMP includes a strategy for implementing and achieving the TMDL and identifies the “designated management agencies” (DMAs). The Forest Service is one of the DMAs and is responsible for land uses on Forest Service-managed land addressed in the NWFP, associated Aquatic Conservation Strategy, and WQMP for the Applegate Sub-basin. Attainment of the TMDL would occur through implementation of the WQMP (ODEQ 2003). In 2004, the TMDL and WQMP were approved by EPA.

Table 3-9. Water Quality Limited Streams

Stream	Parameter	River Mile
Applegate River	Temperature	0 to 46.8
Beaver Creek	Sedimentation	0 to 8.8
	Biological Criteria	
	Temperature	
	Biological Criteria	0 to 8.8
	Temperature	0 to 5.7

Designated Beneficial Uses as defined under Section 303(d) of Clean Water Act include: domestic water supply, irrigation, livestock watering, fish and aquatic life, wildlife, fishing, boating, and water contact recreation.

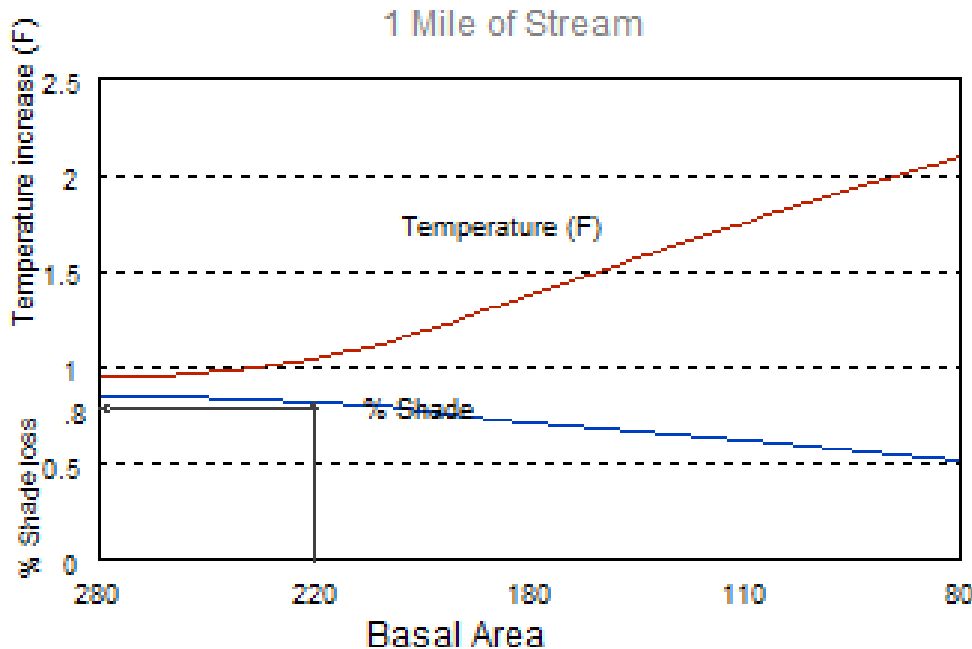
Natural recovery and processes would continue to occur under the current condition. The composition and character of forest stands adjacent to streams would not be altered. Thus, there would be no effect to stream shading and no change to stream temperature. The risk of a high-severity, stand replacement wildfire would remain unchanged in overstocked stands which could result in extensive mortality within Riparian Reserves if this type of fire occurred. Stand replacement wildfire could reduce the supply of future large wood recruitment and reduce stream shade. Therefore, there could be an indirect effect on stream temperature in the Upper Applegate watershed.

There is no new road construction proposed in this project. There would be a maximum of 3,000 feet of temporary road construction. Obliteration of these roads would occur at the completion of their intended use. Temporary roads would not be located within Riparian Reserves or within 100 feet of ephemeral streams. Therefore, there is no loss of vegetation within the primary shade zone and no effect to stream temperature from temporary roads.

Fuels treatment (non-commercial thinning, pile burning, and underburning) in Riparian Reserves would be accomplished by manual thinning and backing prescribed fire into the riparian area. Ignition points would not occur closer than 100 feet from perennial streams. In addition, no hand piles would be burned within 25 feet of a stream (see [Project Design Criteria](#), Chapter 2).

Under the Proposed Action, thinning can remove trees that are providing stream shade which can increase summer stream temperatures. Figure 3-8 illustrates the effects of riparian thinning (e.g., reduced basal area) on increasing stream temperature. No impacts to stream temperature would be expected from thinning because existing stream shade would be maintained.

Figure 3-8. Modeled effects of thinning on stream temperature (SHADOW).



Establishment of a single-track motorized trail tread on the FS Road 2010200 road prism, not including the six drainage crossing locations, with proper erosion control features and maintenance would be expected to function as a sustainable trail that would result in little surface soil erosion which would be quickly captured by trail design features and adjacent vegetation and litter/duff. Any soil movement off the trail tread would not be expected to reach Hanley Gulch below the roadbed due to micro topography, including naturally gravelly/rocky soils, downed wood, and heavy litter/duff on the slopes between the roadbed and Hanley Gulch. In addition, seasonal use restrictions for operation during the dry season only would also minimize erosion potential (Soil Specialist report).

At the six drainage crossings, which are tributaries to Hanley Gulch, there could be the potential for soil erosion off of the trail tread directly into these tributary drainages, depending on channel crossing design. Based on field review at each location, ford crossings would not be able to be designed to guarantee no erosion from loosened trail tread that would reach these drainages and result in sedimentation, due to the steepness of the approaches and the erodibility of the native soils at those gradients.

Beaver Creek and its tributaries is a water quality limited stream for sediment. Culvert crossings along Hanley Gulch were removed in 2010-2011 to be in compliance with Federal Clean Water Act for reducing sediment. Monitoring results from Wolman pebble counts show a slight decrease in fine sediment between 1998 and 2013. A trail bridge design at each crossing would be prepared for this trail system as the best option for ensuring the prevention of any erosion from trail tread reaching live streams.

j. Cumulative Watershed Effects

The area analyzed for cumulative effects is located within three separate sub-watersheds, including the Palmer Creek, Beaver Creek, and Star Gulch Creek all within the Applegate River Watershed and the Rogue River Basin.

The ERA Methodology utilizes GIS analysis of land use activities to convert road, timber harvest, fire, and other disturbances within each sub-watershed to equivalent roaded areas based on coefficients that are regionally specific. The resulting equivalent roaded area within each sub-watershed is divided by the acres of each watershed to calculate a relative disturbance rating, which is called the percent ERA. Then, the percent ERA is compared to the Threshold of Concern (TOC) for each sub-watershed. The TOC is developed specifically for each watershed and is based on channel sensitivity, beneficial uses, soil erodibility, hydrologic response, and slope stability. Once the index values have been determined for each sub-watershed, the Watershed Sensitivity Level (WSL) is calculated. Next, the WSL is converted to a watershed specific TOC value. Finally, the calculated TOC is compared to the percent ERA for each watershed to determine a watershed Risk Ratio. Refer to Table 3-10.

Table 3-10. Equivalent Roaded Area (ERA), Threshold of Concern (TOC), and Risk Ratio by Sub-watershed

Sub-watershed	Factors	Current Condition (Background)	Proposed Action
Palmer	ERA%	5.13%	7.85%
	TOC	10.5	10.5
	Risk Ratio	0.489	0.747
Beaver	ERA%	4.62%	6.73%
	TOC	11.5	11.5
	Risk Ratio	0.402	0.585
Star Gulch	ERA%	5.49%	6.04%
	TOC	11.5	11.5
	Risk Ratio	0.477	0.525

The percent ERA for each of the three sub-watersheds are relatively similar ranging from 4.62 % in Beaver to 5.49% in Star Gulch, perhaps due to an increase in private lands. The risk ratios for all three sub-watersheds are at levels that do not warrant concern at this time.

None of the sub-watersheds show any substantial increase in the risk ratio associated with implementation of the Proposed Action for the UAWRP. This is primarily due to the type and intensity of the proposed treatments. Treatments proposed are primarily “thinning from below” or prescribed burning, and are of low to moderate disturbance. Helicopter logging is also proposed (low disturbance). Approximately 239 acres is proposed for moderate to high disturbance (legacy tree treatment). Based on the analysis described for the UAWRP along with predicted changes resultant from the Upper Applegate Watershed Restoration Project, increase risks of adverse cumulative effects would be minimal. As treated disturbed areas become recovered, watershed conditions would continue on an upward trend.

k. Terrestrial Wildlife Species and Habitats

Project effects to wildlife are evaluated by number of known sites affected, acres of impacts or changes to specific habitat(s), and extent, duration and timing of disturbance. The scale and methodology for evaluating effects differ by species based on their habitat requirements and the type of status they have. This section covers Forest Service Region 6 sensitive species, Northwest Forest Plan survey and manage species, Forest Service management indicator species, migratory birds, and pollinators.

Forest Service Region 6 Sensitive Species

Region 6 sensitive species are species the Regional Forester approves to meet obligations under the ESA, National Forest Management Act (NFMA), and Forest Service Policy that states we should ensure our actions do not contribute to a loss of viability or cause a trend towards listing of a species under the ESA. Generally, they are either species that are warranted for listing status but precluded by higher priority listings or proposed for listing. Additional information on regionally sensitive species can be found at the Interagency Special Status/Sensitive Species Program (ISSSSP) website at:

<http://www.fs.fed.us/r6/sfpnw/issssp/>. The website contains species fact sheets for many of the species and gives detailed life history and habitat needs for the species.

Table 3-11. Regionally Sensitive Wildlife Species Known To Occur or Whose Known Ranges Overlap the Upper Applegate Watershed

Species Common Name	Species documented in the action area	Habitat present in action area	District Occurrence	Habitat
Amphibians and Reptiles				
Foothill yellow- legged frog	Yes	Yes	GBRD WRRD SMRD HCRD	Partially shaded, rocky streams at low to moderate elevations in areas of chaparral, open woodland, and forest. (http://explorer.natureserve.org/)
Black Salamander	Yes	Yes	SMRD	Conifer, hardwood, or mixed conifer forests. Burrow using soil or fallen log debris. Prefer moist woodlands along streams and seepages. (http://explorer.natureserve.org/) SMRD
Siskiyou Mountains salamander	Yes	Yes	SMRD	Highly associated with rocky talus slopes in areas of dense mature and late-seral forest. (http://explorer.natureserve.org/) 1 entry on the Gold Beach/Wild Rivers boundary and several entries about 47 km EES of GBRD over on the Siskiyou Mountains RD—NRIS
Western pond turtle	Yes	Yes	GBRD WRRD SMRD HCRD	Permanent and intermittent waters of rivers, creeks, small lakes and ponds, marshes, unlined irrigation canals, and reservoirs. Often basks on logs, vegetation mats, or rocks. (http://explorer.natureserve.org/)
Birds				
American peregrine falcon	Yes	Yes	GBRD WRRD SMRD HCRD	Open country, cliffs, and sometimes cities. Often found near water, especially along coast. (Audubon - Guide to North American Birds, www.audubon.org/field-guide/bird/peregrine-falcon).
Bald eagle	Yes	Yes	GBRD WRRD SMRD HCRD	Coasts, rivers, large lakes. Typically close to water, also locally in open dry country. Occurs in wide variety of waterside settings where prey is abundant. (Audubon - Guide to North American Birds. (www.audubon.org/field-guide/bird/bald-eagle)).

Species Common Name	Species documented in the action area	Habitat present in action area	District Occurrence	Habitat
Lewis's woodpecker	Yes	Yes	GBRD WRRD SMRD HCRD	Scattered or logged forest, rover groves, burns, foothills. Needs open country with large trees for nest sites and foraging perches (Audubon - Guide to North American Birds, www.audubon.org/field-guide/bird/lewiss-woodpecker)
Insects				
Western bumblebee	No	Yes	GBRD WRRD SMRD HCRD	Generalist pollinators. Stream courses, meadows, recently burned or logged areas or on flowers by roadsides. (USDAFS and Pollinator Partnership, Guide to Bumble Bees of the Western US)
Franklin's bumblebee	No	Yes	SMRD HCRD	Only known from southern OR and northern CA between the Coast and Sierra-Cascade Ranges. Douglas, Jackson, and Josephine Co. in OR. HCRD
<i>Coronis fritillary</i>	No	Yes	GBRD WRRD SMRD HCRD	Siskiyou Mountains in OR. Josephine and Jackson Counties. Expected in Curry, Coos, and Douglas Counties. Mountain slopes, foothills, dry gulches, lower elevation canyons, prairie valleys, meadows, chaparral, sage steppe, and forest glades, margins, and openings. Often congregate on hillsides and meadows overgrown with rabbit-brush and sage. Generally associated with serpentine influenced, rocky hill-slopes dominated by Jeffery Pine. Larvae feed strictly on violets. (USDA FS Species Fact Sheet)
Gray-blue butterfly	Yes	Yes	SMRD HCRD	Found in Southern Cascades and Eastern Siskiyou mountains in Douglas, Jackson, and Klamath counties.
Johnson's hairstreak	No	Yes	GBRD WRRD SMRD HCRD	Host plant: Conifer mistletoes occurring mainly on western hemlock and occasionally true firs. Nectar including Oregon grape, pacific dogwood, ceanothus, pussy paws, and Rubus spp. And visit mud. Late Feb to early Sept. Old Growth obligate and late successional. Spend most time in forest canopy. (http://www.xerces.org/johnsons-hairstreak/)
Mardon skipper	No	Yes	GBRD HCRD	Prairie and meadow habitat with abundant ID fescue. Short, open stature of native fescue bunchgrass stands allow Mardon skippers to readily access both nectar and oviposition plants. Larvae feed on fescues and adults nectar from a variety of plants strongly preferring blue violet. (http://www.xerces.org/mardon-skipper/)

Species Common Name	Species documented in the action area	Habitat present in action area	District Occurrence	Habitat
Siskiyou short-horned grasshopper	Yes	Yes	SMRD HCRD	Southern OR near CA border and Benton County. Type locality in Jackson Country OR. Clear cuts and naturally formed grassy meadows often bordered by fir and less often pine forests. Elderberry is thought to be the preferred plant host for females to lay eggs. (USDA FS Species Fact Sheet)
Mammals				
Pacific fisher	Yes	Yes	GBRD WRRD SMRD HCRD	Occurring only at mid- to lower elevations in mature conifer and mixed conifer/hardwood forests characterized by dense canopies and abundant large trees, snags, and logs (Powell and Zielinski 1994).
Fringed myotis	No	Yes	GBRD WRRD SMRD HCRD	Riparian, grassland, and woodland habitats. Roosts in caves or mines, cliff faces and, snags, and other sheltered sites. Snag obligate in SW Oregon. (http://explorer.natureserve.org/)
Townsend's big-eared	Yes	Yes	GBRD WRRD SMRD HCRD	Found regularly in forested regions and buildings and in areas with a mosaic of woodland, grassland, and/or shrub land. Maternity and hibernation colonies typically are in caves and mine tunnels. Prefer relatively cold places for hibernation, often near entrances and in well-ventilated areas. (http://explorer.natureserve.org/)
Pallid bat	No	Yes	GBRD WRRD SMRD HCRD	Mountainous areas, inter-montane basins often near rocky outcrops and water. Also inhabits open coniferous forest and woodland. Day roosts include crevices of rock outcrops, caves, mine tunnels, buildings, bridges, and hollows of live and dead trees. Documented using snags, bridges and bat boxes in SW OR as maternity sites. (http://explorer.natureserve.org/)
Mollusks				
Oregon shoulderband	Yes	Yes	SMRD	Jackson, Josephine, and Douglas Counties.
Siskiyou hesperian	Yes	Yes	WRRD SMRD HCRD	Upper Klamath Lake, Crater Lake NP, and the Klamath River drainage on the RRS.
Travelling sideband	Yes	Yes	SMRD	Jackson County
District Occurrence: SMRD = Siskiyou Mountains Ranger District; WRRD = Wild Rivers Ranger District; HCRD = High Cascades Ranger District; GBRD = Gold Beach Ranger District				

Potential Effects to Region 6 sensitive species are summarized in Table 3-12.

Table 3-12. Summary of Effects to Region 6 Sensitive Species.

Common Name	Proposed Action
Siskiyou Mountains salamander	Potential ground disturbance to habitats and potentially some disturbance within some High Priority sites. Per the SC, all recommendations for treatments within salamander HP sites and all habitat would be followed
Pacific fisher	Incidental loss of snags or potential disturbance of individuals from project activities and danger tree mitigation. Potential disturbance from activities during the breeding season
Lewis' woodpecker	Incidental loss of snags or potential disturbance of individuals from project activities and danger tree mitigation. Potential disturbance from activities during the breeding season
Oregon shoulderband & Travelling sideband	Oregon shoulderband and Travelling sideband unlikely common in any watershed. Any treatments in moist, rocky habitat with mixed conifer-hardwood overstory could disturb or harm habitat or individuals, especially in warm, wet weather. Required surveys are ongoing and any sites would be protected
Franklin's & Western bumble bees	Franklin's is an unlikely inhabitant in any watershed, Treatments that increase understory sunlight and flowering plant diversity would provide more nectar and pollen. Ground disturbing activities could harm individuals, nests or cause short-term loss of forage.
Fringed myotis. Pallid bat	Incidental loss of snags or potential disturbance of individuals from project activities and danger tree mitigation. Potential disturbance from activities during the breeding season

Siskiyou mountains salamander - Thinning and prescribed fire in unmanaged stands has the potential to impact this species. However, there are modeled high priority sites as well as habitat that would be managed per the Conservation Strategy. Implementation of the Proposed Action May Impact Individuals and or Habitat, but not likely contribute towards a trend to federal listing or a loss of viability to the population or species for both the Siskiyou mountains salamander and the black salamander due to potential disturbance to individuals from treatments.

Pacific fisher - Primary effects to the fisher would come from cutting danger trees, noise from operations, hauling, and activity fuel burning. Fisher are associated with late successional habitat with high canopy cover and decadence components (snags, large down wood). Danger tree felling could reduce large snags, some of which would be left for down wood and some would be removed. Seasonal restrictions to avoid disturbance to spotted owls would also benefit fishers and martens during the breeding season, but they would likely avoid habitat directly involved with project activities during implementation.

The proposed action would treat up to 306 acres of late-successional habitat (NSO NRF) which is high quality habitat for fisher. It would also impact up to 462 acres of mid-aged unmanaged stands that may also be important for fisher, especially if they contain black oak or other hardwoods and are on southeast to southwest aspects that fisher are known to use as den sites. Recent radio telemetry work in the Ashland watershed shows that fisher would continue to use treated NRF habitat and mid-aged stands post treatment if they maintain at least 60 percent canopy and maintain other structures such as hardwoods, down wood and large trees with mistletoe brooms for rest sites (Clayton Pers. Obs.). In fact, in the Ashland watershed at least six dens were used in units post treatment (Clayton Pers Obs). However, it was also shown that fisher tended to avoid areas with less than 60% canopy cover. Approximately 120 acres of NRF in unit 51 would be downgraded and therefore not likely to be available to fisher in the short term. However it is important to maintain and even release live hardwoods in particular black oak in order to maintain that denning habitat on the landscape. In addition, black oak and other hardwood snag were also used to a great extent so every effort should be made to maintain them within all units. Thinning of unmanaged stands and prescribed fire within suitable denning habitat would be restricted to outside of the denning season, March 1 to June 1.

Proposed new trails that occur within suitable habitats for fisher could impact them somewhat, however in Ashland eight fisher dens were located within 100 meter of open well-travelled roads and trails. In that case the animals may have been somewhat habituated to the disturbance. New trails, in particular the motorized trails may cause some avoidance effect by fisher in the short term.

Implementation of the Proposed Action May Impact Individuals and or Habitat, but not likely contribute towards a trend to federal listing or a loss of viability to the population or species for Pacific fisher or Pacific marten (coastal population) due to potential disturbance to individuals and limited loss of habitat from treatments.

Lewis' woodpecker - Direct and indirect would be from cutting danger trees, noise from operations, hauling, and activity fuels burning. Felling of snags for danger tree mitigation may reduce snags suitable for these species. Disturbance restrictions for spotted owls would benefit these woodpeckers in the breeding season.

Implementation of the Proposed Action May Impact Individuals and or Habitat, but not likely contribute towards a trend to federal listing or a loss of viability to the population or species for Lewis's woodpecker or the white-headed woodpecker due to potential disturbance to individuals during treatments and minimal adverse effects to habitat from loss of snags for danger tree mitigation.

Oregon shoulderband, travelling sideband - Potential impacts for these low-mobility species may include mortality from tree felling and equipment operation. Large down wood, large hardwoods and rocky areas would be retained and avoided to the extent possible, but some incidental loss or disturbance of these habitats may occur. No-treat protection buffers on riparian areas would protect some potential habitat and any individuals that may occur there. Treatments that increase hardwood growth and diversity and development of late successional habitat structure would benefit these species. Surveys are currently ongoing in all unmanaged stand that would be mechanically thinned within the proposed action area. Any site that are found would be protected. Survey are not required for trails that do not exceed 5 acres in found disturbance per the Survey and Manage direction. New proposed trails would not be surveyed.

Incidental danger tree felling may provide down wood habitat where site conditions are suitable with cover and moisture. Direct mortality could occur from pile burning.

Implementation of the Proposed Action May Impact Individuals and or Habitat, but not likely contribute towards a trend to federal listing or a loss of viability to the population or species for the Oregon shoulderband or travelling sideband due to potential loss of individuals during treatments and minimal adverse effects to habitat from loss down wood habitat. The travelling sideband is more likely to be affected because it is widely present in the Upper Applegate watershed, whereas the Oregon shoulderband is less likely to occur in project units.

Franklin's and western bumble bees - These species are rare, however there is suitable habitat in the Upper Applegate watershed, though not within the roadside buffer areas. Western bumble bees have been documented recently (2016) near Mt Ashland. Ground disturbing activities such as equipment operation and yarding during the spring, early summer or early fall could cause direct mortality of individuals or destroy bumble bee nests. However, rare plant restoration, pine and oak and other hardwood restoration activities may benefit these species. Mitigations specific to this group of species is to conduct activities outside of the spring breeding and nesting period.

Implementation of the Proposed Action May Impact Individuals and or Habitat, but not likely contribute towards a trend to federal listing or a loss of viability to the population or species for the western bumble bee or Franklin's bumble bee due to potential loss of individuals or nests during treatment activities, though they are rare throughout their range.

Pallid Bat and Fringed myotis - Cutting of danger trees which are large snags in early stages of decay that may provide roost sites may cause incidental disturbance of individual bats during project activities and loss of roosts. All known roosts would be protected from disturbance during the appropriate seasons.

Implementation of the PA May Impact Individuals and or Habitat, but not likely contribute towards a trend to federal listing or a loss of viability to the population or species for the fringed myotis due to potential disturbance of individuals or loss of a small number of large snags from danger tree felling. Known maternity roosts would not be disturbed during the maternity season.

Northwest Forest Plan Survey and Manage Species

Great Gray Owl - The great gray owl occupies boreal, montane and subalpine forests of the western United States. Prey items are primarily small rodents including pocket gophers and voles for which they hunt from perches near large open grassy and woodland areas. They do not build nests and use old hawk and raven stick nests, depressions on broken top snags or stumps, and platforms formed by dwarf mistletoe. Nest sites tend to be located in mature or remnant old-growth forests near large meadow opening with sufficient prey.

The great gray owl is currently a category A species on the December 2003 survey and manage list. Category A species require pre-disturbance surveys and management of known sites. All of the Upper Applegate watershed has been surveyed and there is one known site.

Chase Sideband - The survey protocol used for the Chase Sideband was the Survey Protocol for Survey and Manage Terrestrial Mollusk Species from the Northwest Forest Plan version 3.0, 2003. This protocol includes detailed natural history and habitat descriptions and is available at <https://www.blm.gov/or/plans/surveyandmanage/protocols/> and a species fact sheet available in the project record. Key information is summarized below.

The Chase sideband is currently a category B species on the December 2003 survey and manage list. Category B mollusk species require equivalent-effort surveys and protection of known sites.

This species is endemic to northern California and southwest Oregon. In California, this species has been reported mainly from the Klamath Basin in northern Siskiyou County, from the vicinity of Happy Camp east to the Shasta and Little Shasta River Drainages, in the Goosenest Ranger District of the Klamath National Forest, with a few locations reported as far south and west as Trinity County, on the eastern slopes of the Trinity Mountains in the Weaverville Ranger District of Shasta-Trinity National Forest. In Oregon, sites occur in southern and eastern Jackson and Douglas Counties, in the Klamath-Siskiyou Mountains and the west slopes of the Cascades, north to the Umpqua River basin. One site has been reported from the Klamath River Basin in southwestern Klamath County, Oregon. This species has not been documented in Josephine County.

Chace sidebands are associated with forested and open talus or rocky areas. Vegetation types include dry conifer and mixed conifer/hardwood forest communities as well as oak communities. Mollusks which inhabit rocky habitats also utilize the surrounding forest areas for foraging and dispersal during moist, cool conditions. Seasonal deep refugia include talus deposits and outcrops, which contain stable interstitial spaces large enough for snails to enter. These seasonal refugia also provide protection from fire and predation during inactive periods. Within rocky habitat, the species is also associated with subsurface water, herbaceous vegetation and deciduous leaf litter. In some forested sites, especially in the Oregon Cascades Province, the species has been found associated with down wood where few rock substrates occur. Areas with frequent fire return intervals where rock crevice refugia are available may have historically favored this species over other, larger forms of *Monadenia*.

The Upper Applegate watershed contains suitable habitat for chase sidebands and surveys are ongoing.

Management Indicator Species

The National Forest Management Act of 1976 (NFMA) requires that each national forest identify management indicator species (MIS) in the planning process and that "fish and wildlife habitats would be managed to maintain and improve habitat of selected management indicator species." By monitoring the habitat changes or trends of these particular indicator species, the effects of management activities on the associated animal communities can theoretically be determined.

Table 3-13. Management indicator species for the Rogue River National Forests.

Species	Habitat Represented	Why Selected
Northern spotted owl	Old-growth forest	Endangered/Threatened
Pileated woodpecker, American marten	Mature forest	Represents Specific Habitat
Woodpeckers	Snags (standing dead trees)	Represents Specific Habitat
Black-tailed deer, Roosevelt elk	Early successional forest stages	Species Commonly Hunted

Spotted Owl, Pileated Woodpecker, and American marten - The northern spotted owl was selected as a MIS species because it is a federally listed Threatened species. The Northern spotted owl represents over 150 other wildlife species which use old-growth forest habitat for all or part of their life cycles. The combined habitat networks for spotted owl, and pileated woodpecker, along with intertwined Riparian areas, serve as an interlocking habitat system for all wildlife species which use mature and old-growth forest. Overall, late succession habitat in 2017, totaled 538,953 acres (20+ inches DBH) across the Forest. This habitat is considered to be nesting roosting, and foraging for spotted owls. For a full discussion of spotted owls and the effects of the Proposed Action see the discussion on [Threatened and Endangered Wildlife Species](#), this chapter.

In 2017 over 300,000 acres (15 percent) of the forest burned at varying intensities. There were three large complexes and several other smaller fires that burned across the forest, the Chetco Bar Fire (191,084 acres), the Miller Complex (39,000 acres), and the High Cascades Complex (76,766 acres) were the largest of these fires. Overall, there was a rather small change in the habitat baselines for late-successional habitat associates on the Forest, the northern spotted owl, marten, and pileated woodpecker. Across the Forest within affected watersheds, there was an overall loss of late-successional habitats of approximately 19,000 acres.

Primary Cavity Nesters - For the RRNF, primary cavity excavators are the hairy and downy woodpeckers and the northern flicker. They were chosen to represent all wildlife species which use cavities for nesting or denning.

The amount of forest in an unmanaged condition and providing snags at background levels has declined on both the Rogue River and Siskiyou National Forests. As of 2011, there was far more habitat available and more habitat within reserve land allocations for woodpeckers than was planned for in the original LRMPs. It was anticipated that there was a high likelihood that the forests were providing habitat for far more woodpecker pairs than originally thought to be needed to provide for long term viability for this species. The Biscuit Fire burned through 467,702 acres within the SNF and provides areas with high snag amounts. Fires have increased snag habitat across the forest by approximately 45,000 acres and low severity fire has also somewhat increased potential snag habitat across the forest.

Black-tailed Deer and Roosevelt Elk - Deer and elk represent over 180 other wildlife species needing young successional stages to meet all or some of their life history requirements. Elk do not occupy a large part of the Upper Applegate watershed so black tailed deer are used as that MIS species.

Specifically, on the RRNF, forage habitat for elk and deer is the primary limiting factor on the Forest, constituting less than ten percent of the Forest land base. The west side of the Forest provides good forage in designated big game winter range for black-tail deer (there are very few if any elk on the west side of the Forest) due to a preponderance of low elevation non-conifer forest lands and an active fuels and habitat enhancement program (over 5,500 acres of big game winter range on the Siskiyou mountains RD have been treated in the last 5 years). However, the Cascade portion of the Forest, due to different forest types and management activities, is depauperate in the amount of forage habitat available elk and deer. Elk and deer thermal and hiding cover have increased substantially across the Forest although in some areas of big game winter range still not to that amount prescribed in the original LRMP. Refer to the issue discussion regarding Big Game Winter Range.

Migratory Birds

Focal bird species, which represent important habitat components in a functioning coniferous forest ecosystem, are used in our analysis on migratory birds. The concept is described in detail in Habitat Conservation for Landbirds in the Coniferous Forests of Western Oregon and Washington (Altman and Alexander 2012). In addition, Partners in Flight (PIF) published a revised Landbird Conservation Plan for Canada and the Continental United States in 2017. This plan identifies additional species for BCR 5 of high conservation concern and common species in steep decline for which proactive management of habitat and reduction of threats are expected to reverse population declines. According to the PIF species list, there are 156 birds that could occur within the watersheds associated with this project. For purposes of efficiency, a subset of the full list is shown in Table 3-14. These species were chosen to represent all species that require specific habitat attributes within the various forest conditions that would occur within the Upper Applegate watershed.

Table 3-14. Migratory bird species of concern and associated habitat attributes within the UAW Upper Applegate watershed.

Forest Condition	Habitat Attribute	Focal Species
Old-growth/Mature	Large snags	Pileated Woodpecker
Old-growth/Mature	Large trees	Brown Creeper
Old-Growth/Mature	Deciduous canopy trees	Pacific-slope Flycatcher
Old Growth-Mature	Mid-story tree layers	Varied Thrush
Mature	Conifer-deciduous canopy	Northern goshawk
Mature	Large patches of moist conifer forest	Chestnut-backed chickadee
Mature/Young	Closed canopy	Hermit/Townsend's Warbler
Mature/Young	Open mid-story	Hammond's Flycatcher
Mature/Young	Deciduous understory	Wilson's Warbler
Mature/Young	Forest floor complexity	Pacific Wren
Young/Pole	Deciduous canopy trees	Black-throated Gray Warbler
Young/Shrub	Open shrub dominated	Mountain quail
Young/Shrub	Dense brush/young plantations	Wrentit
Sapling/Seedling	Residual canopy trees	Olive-sided Flycatcher
Sapling/Seedling	Snags	Northern Flicker
Sapling/Seedling	Deciduous vegetation	Orange-crowned Warbler
Unique	Alpine grasslands	American Pipit
Unique	Nectar-producing plants	Rufous Hummingbird
Unique	Mineral springs/seeps	Band-tailed Pigeon
Unique	Montane wet meadows	Lincoln's Sparrow
Unique	Large hollow snags	Vaux's Swift
Unique	Landscape mosaic forest	Blue (Sooty) Grouse
Klamath Mts. Mixed Forest	Pine-oak canopy/subcanopy trees	Purple Finch
Klamath Mts. Mixed Forest	Dense shrub understory	Nashville Warbler
Klamath Mts. Mixed Forest	Shrub-herbaceous interspersion	Hermit Thrush
Klamath Mts. Mixed Forest	Forest canopy edges	Western Tanager
Klamath Mts. Mixed Forest	Montane brushfields	Fox Sparrow
Klamath Mts. Mixed Forest	Post-fire	Lazuli Bunting
Conifer Hardwood Forest	Mixed conifer and hardwoods	Pine siskin
Conifer Forest Edge	Forest edge/shrub openings	Evening grosbeak
Forest Edge/Riparian	Dense, moist vegetation	Allen's hummingbird
Edge/Riparian	Dense riparian shrubs (willow)	Willow Flycatcher

Effects to migratory birds are considered by habitat attributes similar to MIS species but at a finer scale. Effects to these attributes based on treatment types and mechanisms of effects are described below. There would be no effects to migratory birds under the current condition. Current habitat distribution would remain and natural processes such as vegetation encroachment and wildland fire would alter habitat over time.

All treatments have potential to disturb active bird nests during the breeding season which could cause failed reproduction or mortality of young, though seasonal restrictions for spotted owls would also provide protection for other nesting birds. To the extent possible, any active bird nests encountered during project activities would be given a no-treat buffer adequate to avoid a stress response (e.g., flushing an adult from incubating eggs or nestlings, avoid feeding young, or defensive behavior) or mortality until young have fledged. Otherwise, adult birds and fledglings would likely avoid an area during activities until disturbances such as noise and smoke end. For all treatments, noise and smoke disturbance may cause short-term avoidance outside of habitat which may be cumulative with any concurrent treatment of adjacent plantations resulting in a larger area avoided. Proposed road closure and decommissioning would locally reduce impacts of human disturbance and benefit birds that use those areas.

Recreation routes have been shown to affect forest birds. For example, roads may result in the loss or fragmentation of habitat for brown creepers. Hutto (1995) found that brown creepers were twice as likely to occur in habitats that were more than 100 m from a road, and both Keller and Anderson (1992) and Brand and George (2001) found that brown creepers were associated with larger forest patches. Foppen and Reijnen (1994) found that roads and motorized trails reduced forest bird reproduction up to a distance of 200 m. In addition, roads and recreation trails may break up forest patches and increase nest predation and parasitism rates by species such as cowbirds (*Molothrus* spp.) (Hickman 1990, Miller et al. 1998). Gutzwiller et al. (2002) found that human intrusion, in the form of hiking, increased the probability of gray jay (*Perisoreus canadensis*) recurrence, which may increase nest predation on other bird species. Trails used for hiking also can influence forest bird habitat use. Miller et al. (1998) reported a zone of influence of 100 m for some forest bird species and somewhat larger if dogs are also on trails unleashed (Gaines et al. 2003).

However, rare plant restoration, pine and oak and other hardwood restoration activities may benefit those species that favor more open and hardwood dominated habitat types. Mitigations specific to this group of species is to conduct activities outside of the spring breeding and nesting period.

Pollinators

In June of 2014 a Presidential Memorandum was issued to create a Federal strategy to promote the health of honey bees and other pollinators. Federal agencies were tasked with enhancing pollinator habitat on their managed lands, consistent with their mission and public safety. Best management practices for enhancing pollinator habitats have been developed (Xerces Society for Invertebrate Conservation 2015) and would be implemented within the UAW Upper Applegate watershed, where practical.

Habitat for pollinators is varied within the watershed depending on habitat conditions. The best pollinator habitat consists of open landscapes with good sun exposure and many types of native, herbaceous plants (Xerces Society for Invertebrate Conservation 2015). Native forbs are available in smaller amounts, mostly along roadsides and riparian areas. The meadows tend to have more grasses than forbs. Depending on the pollinator species present, other important components are dead wood, open soil for nest sites, and open water.

All proposed treatments under the Proposed Action could result in short-term loss of nectar and pollen due to ground and vegetation disturbance (e.g., brush cutting, burning) near roadside cutting areas, and long-term increases in nectar and pollen production with increased sunlight, reduced competition, and in some cases, rejuvenation from thinning and burning activities. However, rare plant restoration, pine and oak and other hardwood restoration activities may benefit these species. Mitigations specific to this group of species is to conduct activities outside of the spring breeding and nesting period.

Other actions such as Upper Applegate Road Hazardous Fuels Reduction Project may also contribute to cumulative effects to pollinators, however those actions would also likely open up habitats for these species that may be beneficial. Implementation of the Proposed Action **May Impact Individuals and or Habitat**, but not likely contribute towards a trend to federal listing or a loss of viability to the population or species for pollinators due to potential disturbance of individuals or loss of some habitats in the short term for these species

I. Big Game Winter Range

The RRNF LRMP requires Big-Game Winter Range habitat to provide a minimum of 50 percent thermal cover on each 500 to 1,000 acre analysis area. At least two-thirds of the thermal cover (30 percent of the analysis area) should meet optimal thermal cover requirements (USDA Forest Service 1990b, page 4-166).

Thermal cover is defined as cover used by (big game) animals to lessen the effects of weather, typically a stand of coniferous trees 40+ feet tall with an average crown closure of 70 percent or greater. Optimal thermal cover includes these parameters as well as an average stand diameter of 21+ inches DBH (USDA Forest Service 1990b).

To facilitate cover analysis, the District has developed a winter range block system to track thermal cover over time. Because the Rogue River Forest Plan requires tracking of 500 to 1,000 acre blocks, the basis utilized for these winter range blocks is a section (approximately 640 acres). Where winter range does not include the entire section, these portions of the winter range were added to winter range in an adjacent section, as long as they do not exceed 1,000 acres. Winter range blocks may be entirely or partially within the Upper Applegate watershed. Thermal cover values are managed within the assigned winter range block and not by individual project area boundary so they can be tracked through time.

All winter range blocks within the UAWRP area are already below Rogue River LRMP standards and guidelines for Big-Game Winter Range thermal cover.

Commercial timber harvest, non-commercial thinning, fuels treatments, and in particular the plant restoration, and pollinator proposals, in the UAWRP would increase the forage component in many stands for big game for 5 to 15 years. These same treatments would reduce hiding cover over the same acres and over the same time period. The Proposed Action would maintain minimum thermal cover standards required by the Rogue River Forest Plan. Temporary roads and/or road reconstruction proposed under the proposed action would likely result in increased disturbance and vulnerability to big game while the roads remain open. Decommissioning would alleviate these effects within an estimated two decades. Trail decommissioning would also help to reduce disturbance and vulnerability.

Based on these factors the overall direct, indirect, and cumulative effects would result in a positive trend of habitat by increasing forage in the project Upper Applegate watershed. Therefore, the Proposed Actions for the UAWRP would not contribute to an adverse trend in viability on the Rogue River National Forest for black-tailed deer and are consistent with the LRMP, and thus continued viability of black-tailed deer is expected on the Rogue River portion of the Rogue River-Siskiyou National Forest.

Trail decommissioning would have a positive effect by reducing disturbance to deer during the winter in big game winter range. Approximately 0.75 miles of the southern end of the proposed motorized Cinnabar trail and the Hanley Gulch trail are within the allocation for Big Game Winter Range and would be subject to seasonal restrictions for use from November 1 through April 30, per the RRNF LRMP.

The list of past, present, and reasonably foreseeable future actions was reviewed to determine potential effects to black-tailed deer. The only action which would contribute to potential cumulative effects is the Upper Applegate Road (UAR) fuels reduction project because the effects may overlap in time and space.

This project was designed to maintain forest health and habitat diversity, reduce the risk of insect and disease infestations, reduce fuel loading and the effects of wildfire, and increase the quality of upland early seral and riparian vegetation. This project is largely beneficial to black tailed deer.

m. Threatened and Endangered Wildlife Species

During development of this proposed project, the Rogue River-Siskiyou National Forest (RR-SNF) began early conversations with the U. S. Fish and Wildlife Service (USFWS) on potential effects to federally listed wildlife species. The USFWS and RR-SNF wildlife biologists visited the area on September 28th 2018.

The Forest Service is conducting formal consultation with the Fish and Wildlife Service. All activities would be implemented consistent with project descriptions and mandatory project design criteria (PDCs) identified in the final biological assessment and the Service's corresponding biological opinion.

Four species listed under the Endangered Species Act are known to occur on the RR-SNF: marbled murrelet (threatened), northern spotted owl (threatened), gray wolf (endangered) and Oregon spotted frog (threatened).

Gray wolf would not be affected by proposed activities, so they are not analyzed further. Wolves have not been documented, nor are suspected, on the Siskiyou Mountains Ranger District. The nearest documented occurrences are over twenty miles east in the Southern Cascades.

Oregon spotted frog would not be affected by proposed activities so they are not analyzed further. These frogs have not been documented, nor are suspected in the Upper Applegate watershed. Nearest known occurrences are over twenty miles east in the Southern Cascades.

Marbled murrelet would not be affected. The project is not within occupied habitat or critical habitat for the marbled murrelet. The project overlaps a portion of survey zones C and D for which surveys are not required due to the low likelihood of murrelet presence in these zones and any impacts to murrelet in these two zones are considered negligible. (USFWS 2002, letter to RR-SNF and Medford BLM, and USFWS 2002 Technical Assistance on the Final Results of Landscape-level Surveys for Marbled Murrelet in Southwest Oregon [FWS reference: 1-7-02-TA-6401]).

For this analysis the action area is the area within 1.3 miles of proposed treatment units. This distance represents the approximate home range distance of northern spotted owls in the Oregon Klamath province and provides the area for evaluating effects of project activities on owl home ranges that overlap proposed treatment units.

This action area includes 45,000 acres in federal ownership of which 23% are currently northern spotted owl nesting, roosting, or foraging (NRF) habitat. Sixty-three percent of federal NRF acres are in reserved land allocations (e.g., Late-Successional Reserve (LSR), Riparian Reserves, or Congressionally Designated). In addition, approximately 46% of federal acres in the action area are currently dispersal-only habitat.

Proposed treatment units include NRF and dispersal habitat for northern spotted owls. The 2011 Revised Recovery Plan for the Northern Spotted Owl provides considerations and treatment guidelines when designing forest restoration projects (USDI Fish and Wildlife Service 2011b). Treatment objectives were influenced by the desired condition for the stand based on potential contribution to the overall function and resilience of the watershed. In addition, the MAXENT Relative Habitat Suitability (RHS) Model developed by the US Fish and Wildlife Service in its current Spotted Owl Recovery Plan (FWS 2011, Appendix C) was used in development of treatments based on the abiotic suitability of a site for NSO nesting habitat.

Areas identified as low RHS in the Klamath and South Cascade Mountains province are generally on or near primary ridgetops, southerly trending slopes and in habitat not likely to support nesting and roosting habitats. For example, treatments proposed in strategic locations are intended to reduce fuels and risk of high severity fire and provide opportunities to introduce prescribed fire into the watershed at a scale that would maintain certain desired habitat types such as open, late seral with large ponderosa and sugar pine, and mature oak trees. NRF habitat in these strategic locations is generally considered low quality nesting habitat for spotted owls. Owls are not known to nest on these ridges; they tend to be warmer, drier and more exposed than drainages and northerly aspects commonly occupied by NSO.

Conversely, dispersal habitat that occurs in areas of high relative habitat suitability are proposed for treatments that would enhance their development into NRF (USDI Fish and Wildlife Service 2011b)

There are 25 NSO home ranges within 1.3 miles of the proposed actions that overlap portions of the treatment units. Habitat within the known owl sites based on the 2017 modified GNN habitat data is displayed. The NRF minimum thresholds for owl site viability are 50 percent for the core area and 40 percent for the home range (Courtney and others 2004; Thomas and others 1990). Seven sites are at the minimum or above threshold for the core area. At the home range scale, nine sites are at or above the minimum thresholds. Sites with NRF habitat below threshold are less likely to support successful reproduction and fledging for northern spotted owls.

The proposed action would treat and maintain up to 3,912 acres of NRF habitat (37%) (Table 3-15), the primary treatments are prescribed fire and using fire to maintain previously underburned NRF habitat. Up to 3,457 acres of this habitat would be treated by underburning and using fire to reduce ground and ladder fuels. The primary structure and function of NRF would not be affected. Up to 661 acres of NRF would be treated with non-commercial thinning: 221 acres in unmanaged stands; 33 acres thinning in managed stands; and 38 acres within legacy tree thinning units. All of these activities would also maintain the primary structure and function of NRF. Some commercial thinning in unmanaged stands (251 acres) would downgrade NRF habitat (120 acres). This represents one percent of the total NRF habitat within the analysis area.

Table 3-15. Vegetation Treatments and spotted owl habitats

Treatment Type	Non-forest (acres)	Capable (acres)	Forested, not NRF (acres)	Dispersal (acres)	NRF (acres)	PFF¹ (acres)	Total acres
Fuels Maintenance	749	1,548	2,645	2,798	2,330	305	10,375
Legacy Thin	2	41	40	117	38	0	238
Unmanaged non-commercial thin and prescribed fire	25	95	176	190	221	1	708
Prescribed Fire	584	502	1,808	1,107	885	0	4,886
Unmanaged commercial thin and prescribed fire	31	96	187	345	251	0	910
Plantation non-commercial thin and prescribed fire	199	508	713	646	154	0	2220
Plantation-commercial thin and prescribed fire	24	51	32	646	33	0	786
Total Acres	1,614	2,841	5,601	5,849	3,912	306	20,123
¹ Post Fire Foraging							

Dispersal-only habitat conditions can be highly variable but in general consist of forested stands with moderate canopy cover that are dominated by smaller, single aged trees with little if any structural features other essential habitat components for nesting or roosting. Effects to dispersal-only habitats are evaluated at a larger landscape scale due to the life history function of dispersal habitat. The RR-SNF has determined that all proposed treatments would affect 5,849 acres of dispersal habitat (28 percent of the analysis areas dispersal-only habitat) associated with these projects (Table 3-15). The nature of the action and the distribution of effects alone is not expected to be meaningful overall and would not preclude the ability of NSO to disperse across this landscape.

Owl sites are analyzed at the nest patch, core area, and provincial home range scales. Project Design Criteria (in Chapter 2) would be applied to all sites within or adjacent to project units to reduce or eliminate the impacts from potentially disturbing noise or activity near owl sites.

The potential for noise-producing activities to cause harassment of spotted owls is dependent on the background or baseline levels of noise present in the environment. In areas that are continually exposed to higher ambient noise levels (e.g., areas near road Maintenance Level 3 and above, well-traveled roads), spotted owls are probably less susceptible to small increases in noise frequency because they are accustomed to such activities.

No vegetation activities are proposed during the critical breeding season for spotted owls within or within disturbance distances of spotted owl habitat. All of the proposed actions would have any appropriate seasonal restrictions.

The Proposed Action proposes to create 16 to 18 miles of hiking trails, decommission 1.5 miles of motorized trails, and authorize up to 6 miles of motorized trails. With respect to spotted owls, recreational disturbance can cause adverse impacts to spotted owls during the breeding season both on motorized and non-motorized trails. While flush distances were relatively low from hikers, motorized traffic can have an effect further outside any roads or trail. A proposed 1.5 mile single-track motorized route on the Hanley Gulch Road would pass through largely NRF habitat. Motorized noise on this trail could impact up to 38 acres of NRF habitat (1.5 miles and 35 yards on each side of the trail due to motorized disturbance) and it also passes through a spotted owl nest patch and 100 acre core area. A mitigation measure would restrict all motorized traffic along this route from March 1 through June 30 unless surveys show that these owls are not breeding during a given year. If seasonal restrictions are followed during the critical breeding period the effect determination for spotted owl is **May Affect, Not Likely to Adversely Affect** the northern spotted owl. No non-motorized trail is proposed for any owl site or nest patch; therefore no seasonal restrictions for owls would be expected. The reductions in motorized trails from proposed decommissioning within NSO habitat would be a beneficial effect for spotted owl; **May Affect, Not Likely to Adversely Affect** the northern spotted owl.

The northern spotted owl would have short-term impacts with long-term benefits as a result of proposed activities from habitat modification and disturbance. Because activities are likely to adversely affect spotted owls and designated critical habitat, formal consultation with the Service has been initiated. All mandatory conservation measures (project design criteria and mitigation measures) and terms and conditions from the biological opinion would be implemented.

Vegetation treatments would **May Affect and are Likely to Adversely Affect** northern spotted owls due to the downgrading of 120 acres of NRF habitat. All other treatments would maintain spotted owls and spotted owl habitat.

Rare plant, oak and pine habitat restoration would **May Affect, Not Likely to Adversely Affect** spotted owl due to disturbance and would have no effect to spotted owl Designated Critical Habitat. All trail proposals would **May Affect, Not Likely to Adversely Affect** spotted owls. All Required Project Design Criteria and Mitigation Measures would be followed to ensure these effects determinations.

n. Aquatic Habitat and Fish

In compliance with Section 7 of the Endangered Species Act (ESA) and the Forest Service Biological Evaluation (BE) process for Threatened, Endangered, and Sensitive fish species (Rogue River NF LRMP page 4-20), the USDA Forest Service Region 6 Sensitive Species List (updated July 13, 2015), and the Oregon/Washington BLM Sensitive Species List (updated July 29, 2015) were reviewed and field reconnaissance was conducted in regard to potential effects on any of these species by actions associated with the Upper Applegate Watershed Restoration Project. The results are summarized in the Table 3-16.

Table 3-16. Potentially Affected Species, Status, and Habitats Assessed

Species/Habitat		Pre-field Review	Field Surveys
Common name	Scientific Name	Existing Sighting or Potential Habitat ₁ (Yes/No)	Habitat or Species Confirmed ₁ (Yes/No)
ESA Threatened Species			
SONCC Coho salmon	<i>Oncorhynchus kisutch</i>	Y	Y
OC Coho salmon	<i>O. kisutch</i>	N	N
S. DPS North American green sturgeon	<i>Acipenser medirostris</i>	N	N
S. DPS Pacific eulachon	<i>Thaleichthys pacificus</i>	N	N
ESACritical Habitat (CH)			
SONCC coho salmon	<i>O. kisutch</i>	Y	Y
OC coho salmon	<i>O. kisutch</i>	N	N
MSA Essential Fish Habitat (EFH)			
Coho salmon	<i>O. kisutch</i>	Y	Y
Chinook salmon	<i>O. tshawytscha</i>	Y	Y
R6 Forester's and BLM OR State Sensitive Species			
Fish			
Pacific lamprey _{2,3}	<i>Entosphenus tridentatus</i>	Y	Y
KMP steelhead _{2,3}	<i>O. mykiss</i>	Y	Y
OC steelhead _{2,3}	<i>O. mykiss</i>	N	N
SONCC Chinook salmon _{2,3}	<i>O. tshawytscha</i>	Y	Y
Jenny Creek sucker ₃	<i>Catostomus rimiculus</i>	N	N
Umpqua chub ₃	<i>Oregonichthys kalawatseti</i>	N	N
Mollusk			
California floater ₂	<i>Anodonta californiensis</i>	N	N
Western ridged mussel ₂	<i>Gonidea angulata</i>	N	N
Highcap lanx _{2,3}	<i>Lanx alta</i>	N	N
Scale lanx _{2,3}	<i>L. klamathensis</i>	N	N
Rotund lanx _{2,3}	<i>L. subrotunda</i>	N	N
Robust walker ₂	<i>Pomatiopsis binneyi</i>	N	N
Pacific walker ₂	<i>P. californica</i>	N	N
Montane peaclam ₃	<i>Pisidium ultramontanum</i>	N	N
Insect			
Haddock's Rhyacophilan caddisfly ₂	<i>Rhyacophila Haddocki</i>	N	N

Species/Habitat		Pre-field Review	Field Surveys
Common name	Scientific Name	Existing Sighting or Potential Habitat ₁ (Yes/No)	Habitat or Species Confirmed ₁ (Yes/No)
A caddisfly ₃	<i>R. leechi</i>	N	N
₁ Yes – The proposed project’s potential effects on these species will be further analyzed in this document. ₁ No – No further analysis is necessary, and a determination of “No Impact” is rendered. ₂ Forest Service Sensitive ₃ Bureau of Land Management Sensitive			

The Proposed Action does not include any work occurring directly within stream channels or other aquatic habitat that contain aquatic biota. As such no direct effect to aquatic biota species or habitat are expected.

The Northwest Forest Plan Temperature Strategy, demonstrates that thinning can occur in the Riparian Reserve without affecting stream shade if the overstory canopy in the primary shade zone is not treated. See Chapter 2 for the [Project Design Criteria](#) describing the minimum width of the primary shade zone based on slope and tree height. No impacts to stream temperature would be expected from thinning because existing stream shade would be maintained. Thinning activities would be implemented in accordance with Project Design Criteria (PDCs), such that the overstory in the primary shade zone is not degraded.

Skidding and yarding of logs could result in a loss of ground cover, displacement of soil, and compaction of soils (Chamberlain et al. 1991). This could increase upland erosion rates and fine sediment influx into adjacent streams within the Upper Applegate watershed. However, all units (Unit #s 54, 55, and 62) associated with fish bearing streams that would receive commercial thinning treatments are helicopter harvest units. Thus, there is no ground disturbance expected or other causal mechanism that would result in sediment influx into the associated stream systems from thinning activities within these units. Additionally, Unit 61 (cable yarding unit) is located upslope from and within the outer Riparian Reserve of Armstrong Gulch, a small resident trout stream. Implementation of the riparian PDCs (i.e. riparian buffer) would prevent harvest generated sediment from entering Armstrong Gulch adjacent this unit. Armstrong Gulch is located approximately 0.75 mile upstream of critical Coho habitat (CCH) in Beaver Creek.

Adherence to project PDCs would implement a minimum 25 foot no-cut buffer on all streams and a 100’ buffer in which no equipment would be allowed. The 100 foot buffer is designed to limit soil disturbance and the potential for sedimentation into streams. By implementing the mandatory buffer widths, there would be no increase in fine sediment delivery to a stream or associated increase in turbidity from thinning activities.

No new temporary roads would be constructed in Riparian Reserves or across any stream channels; therefore, temporary road construction does not have a mechanism to contribute sediment to the aquatic system.

Timber haul would occur near streams at existing crossings. Haul would occur during dry weather conditions only. During wet weather conditions, sale administrators would cease haul and road maintenance actions when ditch lines begin to flow water and/or roadbeds begin to saturate. Haul routes in proximity to CCH are listed in table below. Adherence to these dry haul standards would ensure no project related sediment effect to adjacent stream channels.

Table 3-17. Timber haul stream crossings

Road #	Associated Stream	Road Surface/Status
FS 1095	Palmer Creek	Gravel/storm proofed
FS 1095500	Lime Gulch	Gravel/storm proofed
FS 2000940	Charlie Buck Gulch	Gravel/storm proofed
FS 2000	Beaver Creek	Paved
BLM 39-3-28	Star Gulch	Paved

The Proposed Action includes prescribed fire and fuels thinning treatments in proximity to the Applegate River, Palmer Creek, Beaver Creek, Star Gulch, and some of the smaller fish bearing tributaries to these streams. The physical cutting, piling, and/or scattering of fuels within the Upper Applegate watershed would not result in effects to aquatic biota outside of those disclosed for other project activities.

Prescribed fire and associated thinning of small diameter within the Riparian Reserve of fish bearing streams has the potential to result in some short-term negative effects to aquatic biota and their habitats, including federally listed SONCC Coho salmon. These prescribed burns would occur when fuel moisture and weather conditions are appropriate to achieve a desired low-mixed severity, mosaic burn characteristic, and low mortality of residual trees. The use of low-mixed severity prescribed fire to treat fuels within the Upper Applegate watershed would result in loss of ground cover and potential minor loss of stream shading. It is possible that ash generated from prescribed fire treatments could enter stream channels. Influxes of ash into a stream system can cause a short-term shift in water chemistry, towards a more alkaline state, and could adversely affect aquatic biota populations (USDA Forest Service 2005).

However, these shifts in water chemistry are not expected to exceed suitable habitat conditions for fish present within the Upper Applegate watershed. Therefore, effects to fish populations from ash influx are unlikely and not anticipated.

Ignition of prescribed fire would occur greater than 100 feet from all perennial streams; though, these burns would be allowed to naturally “back” into this 100 foot buffer as vegetation conditions allow. The naturally higher relative humidity and presence of riparian vegetation would be expected to attenuate effects from these burns in proximity to fish bearing habitat, thereby allowing for maintenance of suitable fish habitat conditions within the associated streams (Arkle and Pilliod 2010).

Within Riparian Reserves on BLM managed lands, prescribed fire would be implemented as outlined in the ROD/RMP for Southwestern Oregon (USDI 2016). The ROD/RMP allows fuels treatments within Riparian Reserves as needed to reduce the risk of stand-replacing crown fire, but prohibits treatments within 60’ of fish bearing and perennial streams, and requires a retention of 50% canopy cover remain per acre, and prohibits cutting of any trees greater than 12” DBH. Outside of the 60’, the remainder of the Riparian Reserve may be treated to 30% canopy cover and down to 60 trees per acre. Adjacent to intermittent, non-fish bearing streams, treatments may occur adjacent to the channel, but must leave 50% canopy cover within the inner 50’ of the Riparian Reserve either side of the channel, and trees greater than 12” DBH must not be cut. Outside of 50’, moderate severity burns must be limited to less than 20% of the area of the Riparian Reserve within each HUC 12 sub-watershed, and 2% down woody material must be retained on the forest floor following treatment.

Fuels reduction would reduce the risk of catastrophic wildfire (USDA Forest Service 2004). Intense wildfires can open streams to solar warming, especially where forest cover is eliminated. Reduction or elimination of forest and understory cover generally results in an increase in surface erosion, particularly over the following winter. Understory vegetation typically recovers rapidly; however, an intense wildfire would likely result in a flush of sediment into the stream network during the first winter and spring. Potential reduction of severe fire behavior and its effects is a beneficial effect of the proposed action to aquatic biota and habitat.

The Proposed Action includes approximately 3 miles of road restoration activities. However, these restoration actions are generally not located in proximity to fish bearing habitat. Specifically, the proposed road restoration at FS Road 1010500 and the unnumbered FS spur located near Jackson Campground are not located in proximity to any fish bearing streams. Restoration actions at these road segments would contribute to the cumulative beneficial effect to decreased road sediment production and improved water quality related to road restoration work within the Upper Applegate watershed. However, no impact to aquatic biota or habitat would be expected from the road restoration work at these two locations.

Stormproofing of FS Road 2000920 would have beneficial effects to aquatic habitat in adjacent Armstrong Gulch, through the reduction of road generated sediment. This action would also cumulatively contribute to the improved water quality within the Beaver Creek sub-watershed, particularly in concert with the road restoration work that was completed as part of the FS Applegate River-McKee Bridge Legacy Roads Project in 2010.

The proposed action includes new motorized single-track trails in the Beaver Creek sub-watershed. The proposed trails are largely located on existing abandoned trail and road segments. However, there would be some needed trail construction in steep locations and to connect the proposed trails to existing roads.

The proposed Cinnabar Lookout Trail is an existing abandoned trail that does not occur in proximity to any fish bearing streams or other aquatic habitat. Thus, there is no causal mechanism for effects to any aquatic biota or habitat.

The proposed Charlie Buck Trail is an existing abandoned trail that does not occur in proximity to any fish bearing streams or other aquatic habitat. The extreme northern end of this trail intersects the outer margin of the Beaver Creek Riparian Reserve, where the trail intersects and follows the decommissioned FS Road 2000941. Due to its location, not in proximity to fish bearing streams or other aquatic biota habitat, no effect to any aquatic biota or habitat is expected.

The proposed motorized trail along the decommissioned bed of FS Road 2010200 road is located almost entirely within the Riparian Reserve of Hanley Gulch. Hanley Gulch is small fish bearing tributary to Beaver Creek, which is occupied by steelhead, rainbow trout, and cutthroat trout. Hanley Gulch enters Beaver Creek approximately 1.6 miles upstream of CCH. Based on the hydrology and soils analysis, establishment of the motorized trail upon the existing road bed is not expected to result in sediment input into Hanley Gulch. Therefore, no effect to aquatic biota within Hanley Gulch or downstream reaches is expected.

New non-motorized trail is proposed along existing ditch lines west of the Applegate River. This trail would run roughly between Kanaka Gulch and FS Road 1010500. This proposed trail would cross one fish bearing stream, Palmer Creek. This crossing would be an unimproved crossing, and would not affect the current aquatic habitat condition or trend.

Additional new non-motorized trail is proposed near Brushy Gulch on FS land and along the decommissioned Lady Bug Gulch road on BLM land. The Brushy Gulch trail is not located in proximity to any fish bearing stream or other aquatic habitat. The proposed Tallowbox Trail would be located along a decommissioned road bed adjacent to Lady Bug Gulch, a small cutthroat trout bearing tributary to Star Gulch. This decommissioned Lady Bug road crosses Lady Bug Gulch three times, two of which are located within the cutthroat trout distribution of the stream.

The proposed action also would obliterate and restore unauthorized OHV trails located near Brushy Gulch, Jackson Campground, and Boulder City/FS Road 2000940. None of the routes are located in proximity to any fish bearing streams or other aquatic habitat. Thus, there is no causal mechanism for effects to any aquatic biota or habitat.

Past, present, and foreseeable future activities have the potential to work synergistically with the proposed activities in the Upper Applegate Watershed Restoration Project. The only effects identified to aquatic resources from project activities is from prescribed fire and fuels treatments within Riparian Reserves. These activities are designed to be beneficial to the riparian resource in the long-term, with limited short-term negative effects to aquatic habitat and associated aquatic biota. These short-term effects are cumulative with past prescribed fire and fuels treatments within the Upper Applegate River watershed on FS and BLM land, and with effects to the aquatic resource from the recent Burnt Peak Fire in 2017.

Prescribed fire and fuels treatments within Riparian Reserves included in the proposed action would result in short-term effects based on a review of best available science and professional judgment.

Consequently, a determination of **“May Affect, Not Likely to Adversely Affect”** SONCC Coho salmon and its Critical Habitat is rendered. A determination of **“May Impact Individuals or Habitat, but will Not Likely Contribute to a Trend toward Federal Listing or Cause a Loss of Viability to the Population or Species”** is made for KMP Steelhead, SONCC Chinook salmon, and Pacific lamprey. All other activities within proposed action would have no effect to SONCC Coho and CCH.

Essential Fish Habitat is the same as CCH in the Upper Applegate watershed. Therefore, the same determination of effect applies to EFH, as was disclosed above for CCH. The Upper Applegate Watershed Restoration Project would have a **“Not Likely to Adversely Affect”** to Essential Fish Habitat for Coho salmon and Chinook salmon.

This project fits under the categories described in the *Re-initiation of the Endangered Species Act Section 7 Formal Programmatic Conference and Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Aquatic Restoration Activities in the States of Oregon and Washington* (2013 ARBO) for category #15. Riparian Vegetation Treatment (Controlled Burning). Therefore, no consultation with the National Marine Fisheries Service is required provided the Project Design Criteria are followed.

o. Riparian Reserves

Land management direction for the Upper Applegate watershed is contained in two separate documents: one for lands administered by the Rogue River-Siskiyou National Forest; and one for the lands administered by the Medford District Bureau of Land management. Although both land management plans contain and allocation for Riparian Reserves, each plan is unique.

Riparian Reserves include lands along all streams, lakes, ponds, wetlands, unstable areas, and potentially unstable areas that are subject to special Standards and Guidelines designed to conserve aquatic and riparian-dependent species.

Treatments on Lands Administered by the Forest Service

On National Forest administered lands, Standards and Guidelines apply to activities in Riparian Reserves that may otherwise retard or prevent attainment of Aquatic Conservation Strategy (ACS) objectives, as defined in the 1994 ROD for the NWFP.

The analysis of the Proposed Action is discussed in context of the affected sub-watersheds relative to Riparian Reserve Standards and Guidelines (1994 NWFP ROD, pages C-31 through C-39). These Standards and Guidelines were reviewed for applicability relative to the types of actions being proposed under the Proposed Action.

Table 3-18. Evaluation of Applicable NWFP Riparian Reserve Standards and Guidelines

	Standard and Guideline	Proposed Action
Timber Management	TM-1	For treatments in Riparian Reserves, the Proposed Action is designed to control stocking and create desired vegetation characteristics to meet ACS objectives.
Roads Management	RF-2	The Proposed Action proposes no new roads or landings within Riparian Reserves.
	RF-4	The Proposed Action proposes no new stream crossings.
	RF-6	The Proposed Action proposes no new stream crossings.
	RF-7	The Proposed Action related Road Management Objectives would continue to be in place and inspection and maintenance during and after storm events would be a reoccurring practice in this area.
Recreation Management	RM-1	No new trails or recreational facilities are proposed within Riparian Reserves under the Proposed Action.
	RM-2	The Proposed Action would improve the dispersed recreation site at the Placer area by restricted motorized access with the Riparian Reserve.
Fire/Fuels Management	FM-1 and FM-4	The Proposed Action includes fuel treatment and fire suppression strategies, practices, and activities to allow attainment of ACS objectives and to minimize disturbance of riparian ground cover and vegetation. The Proposed Action recognizes the role of fire in ecosystem function (refer to Riparian Reserve project design criteria, Chapter 2) and has identified instances where fire suppression or fuels management activities could affect long-term ecosystem function.
	FM-2	Incident bases, camps, helibases, staging areas, helispots and other centers for incident activities would continue to be located outside Riparian Reserves. All design specifications for existing and proposed roads and landings would minimize delivery of sediment to streams.
	FM-3 and FM-5	Under the Proposed Action, delivery of chemical retardant, foam, or additives to surface waters would continue to be minimized in accordance with the RR-SNF Fire Management Plan. The Proposed Action would enact treatments to make the landscape more fire resilient, which would have the indirect effect of requiring less fire suppression (i.e., retardant) needing to be used. Emergency and rehabilitation teams would evaluate fire damaged Riparian Reserves, per the RR-SNF Fire Management Plan.
Fire/Fuels and General Riparian Area Management	Other And RA-4	Under the Proposed Action, the goal of wildfire suppression in Riparian Reserves is to limit the size of all fires. As fuel reduction treatments are enacted and as monitoring is accomplished with additional information gathered, prescribed fire could become one of the tools used by land managers in the future in riparian areas. Rapidly extinguishing smoldering coarse woody material and duff is considered to preserve ecosystem elements. In Riparian Reserves, water drafting sites are located and managed to minimize adverse effects on riparian habitat and water quality, consistent with ACS objectives.
General Riparian	RA-1	Under the Proposed Action, there would be no measurable change to the timing, duration, or magnitude of low flow and peak flow conditions due to project design and employment of Mitigation Measures.

	Standard and Guideline	Proposed Action
Area Management	RA-2	As part of project design and in accordance with Mitigation Measures for the Proposed Action, some trees may be felled in Riparian Reserves. These trees would be left on-site unless they adversely contribute to fuel loading.
	RA-3	The Proposed Action does not plan the use of herbicides, insecticides, toxicants, or other chemicals within or in proximity to Riparian Reserves.
Watershed and Habitat Restoration	WR-3	Mitigation measures employed under the Proposed Action are not used to replace any habitat degradation. Project design criteria and mitigation measure are employed to prevent any habitat degradation.

Treatments on Lands Administered by the BLM

Management Objectives for Riparian Reserves on lands administered by the BLM include:

- Contribute to the conservation and recovery of ESA-listed fish species and their habitats and provide for conservation of Bureau Special Status fish and other Bureau Special Status riparian-associated species.
- Maintain and restore natural channel dynamics, processes, and the proper functioning condition of riparian areas, stream channels, and wetlands by providing forest shade, sediment filtering, wood recruitment, stream bank and channel stability, water storage and release, vegetation diversity, nutrient cycling, and cool and moist microclimates.
- Maintain water quality and streamflows within the range of natural variability, to protect aquatic biodiversity, provide quality water for contact recreation and drinking water sources.
- Meet Oregon Department of Environmental Quality (ODEQ) water quality criteria.
- Maintain high quality water and contribute to the restoration of degraded water quality for 303(d)-listed streams.
- Maintain high quality waters within ODEQ-designated Source Water Protection watersheds.

No treatments are planned within Riparian Reserves with the exception of prescribed burning. All planned burning would be designed to meet these objectives.

p. Aquatic Conservation Strategy

On the Rogue River-Siskiyou National Forest portion of the project, the Northwest Forest Plan requires project consistency with ACS with specific reference to nine ACS Objectives. Below, is a summation of the environmental analysis regarding consistency with the elements and components of the ACS Objectives. Additional discussion and rationale may be found in analysis documented under other Relevant Issues in this Chapter including soils, hydrology, water quality, fisheries, and terrestrial wildlife.

ACS Objective 1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

The Proposed Action is expected to have no effect on watershed and landscape-scale features because they are largely avoided. Density management (thinning) could occur within portions of intermittent, non-fish bearing stream Riparian Reserves, however canopy closure would not be reduced below 40% overall. Treatments would improve stand structure and composition.

Connected actions such as temporary roads would be developed outside of Riparian Reserves, utilized and decommissioned after use. Logging systems and use of temporary and existing roads for haul would employ extensive Project Design Criteria and Mitigation Measures. The Proposed Action would have an immeasurable and undetectable effect with a long-term beneficial effect on watershed and landscape-scale features.

ACS Objective 2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian dependent species.

The Proposed Action is expected to maintain spatial and temporal connectivity within and between watersheds. Density management (thinning) could occur within portions of intermittent, non-fish bearing stream Riparian Reserves, however canopy closure would not be reduced below 40% overall. Treatments would improve stand structure and composition. Connected actions such as temporary roads would be developed outside of Riparian Reserves, utilized and decommissioned after use. Logging systems and use of temporary and existing roads for haul would employ extensive Project Design Criteria and Mitigation Measures. The Proposed Action would have no effect on network connections and would not create any physical obstructions. There would be no measurable effect on aquatic and riparian dependent species, with a long term beneficial effect.

ACS Objective 3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

The Proposed Action is expected to maintain physical integrity of the aquatic system. Density management (thinning) could occur within portions of intermittent, non-fish bearing Riparian Reserves, however no activity would occur within 25 feet of the streamcourse. Treatments would improve stand structure, composition and the integrity of the aquatic system. Connected actions such as temporary roads would be developed outside of Riparian Reserves, utilized and decommissioned after use. Logging systems and use of temporary and existing roads for haul would employ extensive Project Design Criteria and Mitigation Measures.

ACS Objective 4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

The Proposed Action is expected to maintain water quality. Density management (thinning) could occur within portions of intermittent, non-fish bearing Riparian Reserves, however no activity would occur within 25 feet of the streamcourse. Treatments would improve the biological, physical and chemical integrity of the aquatic system. Connected actions such as temporary roads would be developed outside of Riparian Reserves, utilized and decommissioned after use. Logging systems and use of temporary and existing roads for haul would employ extensive Project Design Criteria and Mitigation Measures. There would be no measurable effect on water quality.

ACS Objective 5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

The Proposed Action is expected to maintain the sediment regime under which aquatic ecosystems evolved, with an immeasurable and undetectable effect on sediment regime.

Density management (thinning) could occur within portions of intermittent, non-fish bearing Riparian Reserves, however no activity would occur within 25 feet of the streamcourse. Connected actions such as temporary roads would be developed outside of Riparian Reserves, utilized and decommissioned after use. Logging systems and use of temporary and existing roads for haul would employ extensive Project Design Criteria and Mitigation Measures. There would be no measurable effect on the sediment regime.

ACS Objective 6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

The Proposed Action is expected to maintain stream flow. Density management (thinning) could occur within portions of intermittent, non-fish bearing Riparian Reserves, however no activity would occur within 25 feet of the streamcourse. Connected actions such as temporary roads would be developed outside of Riparian Reserves, utilized and decommissioned after use. Logging systems and use of temporary and existing roads for haul would employ extensive Project Design Criteria and Mitigation Measures. There would be no measurable effect on stream flow.

ACS Objective 7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

The Proposed Action is expected to maintain the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands. There would be no effects to these features. Indirect effects to floodplain inundation and water table elevation in meadows and wetlands are not anticipated.

ACS Objective 8. Maintain and restore the species composition and structural diversity of plant communities in Riparian Reserves and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

The Proposed Action is expected to maintain the species composition and structural diversity of plant communities in Riparian Reserves and wetlands. Manipulation of vegetation within Riparian Reserves would be generally avoided. No effects are anticipated that would affect species composition and structural diversity of plant communities within Riparian Reserves and wetlands.

ACS Objective 9. Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian dependent species.

The Proposed Action is expected to maintain habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian dependent species. There would be no measurable adverse effects, with a long term beneficial effect.

Therefore, as an overall determination, the impacts associated with the Proposed Action, either directly, indirectly, individually or cumulatively, would not prevent attainment of Aquatic Conservation Strategy, nor the nine ACS Objectives, at the site (Upper Applegate watershed), watershed (Analysis Area) or landscape (Upper Applegate River fifth-field) scales.

q. Non-Native (Noxious) Plant Species

Under the current condition, there would be only vegetation or ground-disturbing activities that have current NEPA decisions. Therefore, there would be no new mechanisms to affect non-native species and current conditions would continue. Many species could potentially be introduced or spread under a high-severity wildfire situation due to suppression activities. The following table shows noxious weeds officially designated by the Oregon Department of Agriculture that may be found in the Upper Applegate watershed.

Table 3-19. Noxious weeds designated by the Oregon Department of Agriculture

Noxious Weed	Comments
Armenian (Himalayan) blackberry	Found in many parts of the watershed where riparian conditions exist, especially areas close to roads or disturbed sites.
Bull thistle	Common in the Upper Applegate watershed. It is highly mobile from wind-born seeds and the soil holds bull thistle seeds that will germinate and grow when areas are disturbed. Most areas where this species is found in the watershed are not considered for treatment due to the transitory nature of the species and its response of decreasing in density with increasing shade.
Cut-leaf teasel	Found along Charlie Buck Gulch and along the Gin Lin Trail. These are the only known sites of this species on the Siskiyou Mountains Ranger District.
Dalmation toadflax	Known to occur on private land that borders the BLM and Forest Service near Star Ranger Station.
Diffuse knapweed	Known to occur in one area on Kanaka Road, near Applegate Dam, and another area adjacent to FS Road 1090.
English ivy	Occurs at one site near Gin Lin, and another on Beaver Creek. Like bigleaf periwinkle, this species is associated with historic occupancy, and is probably more widespread than documented.
Klamath weed (St. John's wort)	Generally found in low densities along roads or open areas within the watershed.
Medusahead rye	Found in many disturbed sites, roadsides, and dry slopes. It is often found in areas where yellow starthistle occurs.
Perennial peavine	Primarily known to occur along Upper Applegate Road and FS Road 1090. This species, like bigleaf periwinkle, is often associated with historic occupancy or homesteading. Unlike bigleaf periwinkle and English ivy, it is more likely to spread on its own and pioneer new populations.
Poison hemlock	Only known to occur at one location, on private land, near Star Ranger Station.
Scotch broom	Occupies 9 sites within the watershed. The largest concentration is found in T. 40S., R.3W., section 30, NW1/4 on both sides of the Applegate River. This site is adjacent to a large concentration on private lands. Several smaller sites are found: along the Applegate River at an old home site in T. 40S., R.3W., section 19 NW1/4; at Jackson Campground T. 40S., R.3W., sections 5 and 8; at four scattered sites across Upper Applegate Road from Jackson Campground in T. 40S., R.3W., section 5; and at an isolated site in T. 40S., R. 4W., section 24 NW ¼ of the NW ¼ section, south of unit 84.
Sulphur cinquefoil	Occurs on 16 populations across the Upper Applegate watershed. Most populations are small with isolated individuals.
Tree of Heaven	This species occurs on one location near Gin Lin Trail.
Yellow flag iris	One population occurs along the Applegate River mostly on private and BLM land near Star Ranger Station, and the other population occurs along Beaver Creek.
Yellow and Maltese starthistle	Found in at least 13 different locations in the watershed. Many of these sites are quite large and are located along roads (FS Roads 1090 and 1095) and around the Star Ranger Station compound. One large site of approximately 10 acres is located on an isolated parcel in T. 39S., R.3W., section 22 W1/2. The southern side of this parcel is adjacent to a private starthistle infested field and was used informally in the past by the previous adjacent landowner. In addition, many sites are found in adjacent locations on private land and Army

Noxious Weed	Comments
	Corps of Engineers managed land. Some sites are found ¼ mile or more away from any roads, the most notable being a recently discovered large population in T. 40s., R. 4W., section 24 NW ¼ of the NW ¼, south of unit 84.
Ventenata	Known from four sites in the Project Area, all of which occur along Kanaka Road, its spurs, or near Army Corps Land at the north end of the reservoir

Despite the use of project design criteria and mitigation measures, it is expected that there is a high potential for the Proposed Action to spread current infestations, introduce noxious weeds to other parts of the watershed, or facilitate the nearby infestations to spread into the treated areas. In particular, ground disturbing activities including tree-yrading or skidding, road decommissioning, trail creation, and/or temporary road creation and obliteration all have the potential to create areas suitable for invasion by invasive plant species. Manual and herbicide treatments of invasive plant populations are on-going and have shown great progress in curtailing or even exterminating invasive plant populations; nevertheless, there are still many extant populations near or within the areas proposed for ground-disturbing activities.

The Proposed Action carries a risk of introducing or spreading non-native species by opening up and disturbing habitat that may allow seeds to become established from current on-going activities in the watershed, and other neighboring private-land associated vectors. Humans, animals and machinery are vectors and any disturbance is an opportunity for establishment of these species. Furthermore, pre-existing seed-beds may be released by thinning and burning activities, stimulating new populations of invasive plants. Current levels of indirect risk of introduction or spread of non-native species would remain moderate. Mitigation measures to prevent and control the spread of invasive non-native plants would aid but not completely eliminate this risk.

On National Forest lands, mitigation measures were employed on the previously completed projects and no known spread or introduction of invasive species has occurred. It is unknown if any of the projects on private lands led to increased spread or introduction of invasive species but it is likely that this has occurred without mitigation measures in place.

r. Heritage (Cultural) Resources

As a result of Section 106 consultation (pending), project design and the effective application of standard protection measures, the Upper Applegate Watershed Restoration Project would not result in any direct, indirect or cumulative adverse effects to districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of important scientific values, cultural resources, or historic properties.

The agencies are consulting with and would continue to consult with the Oregon State Historic Preservation Office, and federally recognized tribes regarding project effects, until the decision is reached. At the time of this document, one hundred and seventy-six cultural resources have been recorded within the area of potential effects for the UAWRP. Field surveys within the area of potential effects for the project area have not been completed. Formal consultation will occur with the Oregon State Historic Preservation Office to develop an agreement that would allow for phased surveys as described in Subpart B of the Section 106 process (36 CFR 800.4(b)(2)), and to resolve an potential adverse effects to historic properties (36 CFR 800.6(c)).

s. Air Quality

Wildland fires are naturally occurring events, and can be responsible for emissions of substantial amounts of pollutants, particularly CO and particulates. Management activities such as proposed under the Upper Applegate Watershed Restoration Project are attempting to minimize the risk of unmanaged large-scale fires. Minimizing this risk subsequently reduces the risk of large, uncontrolled air emissions, expected under the current condition.

Activities designed to minimize the risk of conflagrations through prescribed burning and surface fuel/ladder fuel reduction may lead to temporary increases in air emissions. However, these emissions are smaller in volume than natural fires, and can be scheduled to take advantage of favorable meteorological conditions.

Since all burning would be prescribed and controlled, there would be ample opportunity to schedule burning when the atmospheric conditions are optimal for smoke dispersal. Likewise, there would be an opportunity to limit the size of burning events to control emissions. It is expected that the Proposed Action would not result in a violation of National Ambient Air Quality Standards, or an appreciable reduction in air quality related values.

t. Scenic Quality

Under the Rogue River National Forest LRMP each Management Strategy has an assigned Visual Quality Objectives (VQOs) in order to maintain a sense of a natural system and meet the public's scenic expectations in the National Forest.

In the Upper Applegate watershed, visual quality objectives and guidelines associated with Modification and Maximum Modification VQOs would be met with the Proposed Action. Mechanical thinning and prescribed fire are expected to create openings in the forest less than $\frac{3}{4}$ acre. These openings would create a more park like appearance that is characteristic of old growth forests and the naturally established form of the landscape would be maintained.

A short- term impact to scenic quality in the immediate foreground (< 300 ft.) in the Retention and Partial Retention VQO areas would occur with ground and vegetation disturbance, slash piles, and prescribed fire. Immediate foreground views from portions of some trails, roads, campgrounds and distant views from certain viewpoints on trails would change following treatments. These activities would create some ground and vegetation disturbance and slash that visitors would be able to see along road and trails and from the campgrounds.

The resulting change in forest appearance or views along trails, with nearby treatment units, would not be dramatically different than current conditions. Several previous treatments (prescribed fire, thinning, and commercial timber sales) have occurred in this area in the past, and the current forest landscape is varied, including evidence of even and uneven aged vegetation management. Views currently include a mix of vegetation textures and color, tree sizes, and natural openings.

The visual impacts from treatments in both the short-term and long-term would be minimal to undetectable depending on the user. In the long-term removing the thick vegetation by thinning would produce a more open, park like appearance with large trees characteristic of old growth stands and immediate foreground views from trails, roads and campgrounds would blend into the landscape within a few years as vegetation returns. The clearings and thinning work would repeat the form, line and texture from the surrounding vegetative pattern to achieve the partial retention objective.

Past actions in the project area include the construction of existing roads and trails, which are used as viewing platforms and, therefore, are generally not considered negative visual elements. Recreation sites (such as campgrounds and picnic areas) have not resulted in substantial impacts to visual resources. Most visitors to the area travel on Upper Applegate Road, Forest Road 20 and County Road 788 and some past vegetation management activities can be observed from these roads. Past wildfires and insect infestations have affected visual quality in some areas in the Upper Applegate Valley, however, these are natural disturbances in the landscape and, therefore, generally not considered in effects analyses.

Since the actions described above do not contribute substantial effects to visual quality, the proposed project, when added to past, present, and reasonably foreseeable future actions, is not expected to cause cumulative effects beyond those described in the analysis.

u. Operational and Economic Feasibility

This issue focuses on the operational feasibility and the mechanisms to fund restoration treatments. Because there would be no activities associated with the current condition, the discussion of operational feasibility for this alternative is not applicable.

Operational feasibility has been addressed during the design phase of the Proposed Action. It is assumed that all of the proposed treatments can be physically accomplished (humanly possible). All of the restoration activities proposed have been successfully accomplished either on other locations on the Rogue River-Siskiyou National Forest and the Medford District, BLM or on other areas with similar attributes. Therefore, all activities under the Proposed Action are operationally feasible.

Under the current condition, there would be no costs associated with restoration and no funding needs nor would there be any potential revenues generated to fund future restoration treatments.

A review of past contracts for performing restoration projects (similar to non-commercial thinning costs) provides a general per unit cost for completing this type of work. An approximate average ranges from slightly below \$1,000 to over \$1,200 per acre to complete understory thinning and activity fuel treatments such as hand piling and burning. The cost for prescribed fire (underburning) ranges from \$300 to \$600 per acre, depending on the complexity of the activity (amount of fuels, topography, etc.).

If these average costs per acre are assumed, then it is estimated that the restoration treatments within the Upper Applegate watershed could be completed for approximately ten to fourteen million dollars (this assumes approximately \$1,000 per acre for mechanical treatments and \$500 per acre for maintenance treatments, times the number of treated acres). If the total cost were spread over a fifteen year period, it would work out to a cost of just under one million dollars per year to accomplish the restoration objectives.

With stewardship authority, the potential for economic return from the sale of products would help pay for some of the cost of implementing treatments. Under the Proposed Action biomass could be made available to the woods product industry. It is estimated that the Proposed Action would remove approximately 5-7 MMBF (million board feet) of biomass from trees greater than nine inches in diameter. This could generate approximately from 2-4 million dollars for the Proposed Action depending on current market conditions which would determine the actual value of the biomass available for commercial removal.

Funding is a variable that is difficult to predict. Stewardship contracting or agreements are only one of the options being considered for implementation of the UAWRP. There are also standard timber sale contracts, service contracts, partnerships, and other methods that may be employed. No specific method is favored or has been selected. An evaluation of all the options would be employed to determine the most effective method for implementing the restoration treatments.

The UAWRP would also support local economies through recreation use. The Forest Service invests in such things as the construction and maintenance of infrastructure, environmental restoration, and forest health. In 2016, the sum of these activities on the entire Rogue River-Siskiyou National Forest supported approximately 2,330 local jobs and \$111,336,000 in local labor income¹⁵.

v. Grazing Allotments

There are portions of two grazing allotments that are present in the Upper Applegate watershed: Beaver-Silver and Upper Big Applegate.

Beaver-Silver Allotment

This allotment totals approximately 31,038 acres. The Beaver-Silver Allotment has two grazing permittees. One permittee uses lower Beaver Creek and Yale Creek up to Silver Fork Basin. The other permittee uses Beaver Creek, shared pasture with BLM and Forest Service, a portion of Mule Creek, along Forest Service Road 20 to Silver Fork and then to the Donomore Meadows area. This allotment has range improvements including fences, spring developments, and a cabin.

The allotment does have ample water and springs. The lower part is mixed with BLM and Forest Service managed lands. Like all allotments on the Siskiyou Mountains Ranger District, conifers are encroaching on meadows. Any thinning activities and introduction of fire to remove the fuels would improve the allotment.

Upper Big Applegate Allotment

This allotment totals approximately 89,515 acres. The Upper Big Applegate Allotment currently has one grazing permit and two permittees that use the allotment. The allotment has extensive range improvements which include allotment and pasture fences, spring developments with spring boxes, pipelines, troughs; and corrals.

Meadows are becoming over-grown with conifer trees. Thinning, tree and brush removal, and prescribed fire would improve these areas.

Within the Upper Big Applegate allotment, the Proposed Action including thinning and prescribed fire would improve the understory diversity and forage for livestock and wildlife. Broadcast burning would be preferable to pile burning to increase the understory forage base and botanical resources. A focus on trees encroaching meadows should be addressed to reduce losses of meadows for livestock and wildlife populations.

Roads are important to administration and success of the permits. There is a concern that thinning could remove natural boundaries between allotments and housing developments that may require fences to be built to keep cattle away. An option to fencing could be leaving large down trees in strategic areas to prevent cattle from moving outside the allotment and thus maintaining natural allotment boundaries.

In summary, the UAWRP would enhance understory vegetation within the allotments for livestock and wildlife, however the project needs to be cautious not to open areas along allotment boundaries or housing developments. Opening up the trees along housing developments could entice livestock and wildlife near them and potentially create conflicts.

¹⁵ http://fsweb.wo.fs.fed.us/economic_contribution/documents/EconomicContributionWebsiteUserGuideApr2016.pdf.

IV. Other Effects

The following is a summary of effects that were considered during the analysis process, not necessarily as issues, and not always totally quantifiable. All effects were determined to be consistent within the standards and guidelines identified in the Rogue River National Forest LRMP and the Southwestern Oregon Record of Decision and Resource Management Plan (2016 ROD/RMP). Analysis of these issues contributes to informing the decision makers.

a. Relationships between Local, Short-Term, Uses of the Human Environment and Maintenance or Enhancement of Long-Term Productivity

The Proposed Action would help to protect long-term productivity by improving stand resilience to natural disturbances. With full implementation of the mitigation measures and management requirements and constraints developed for the Proposed Action, soil productivity would be maintained over the long-term.

Short-term uses are expected to change the human environment during prescribed burning and logging/hauling operations. Long-term effects should not appreciably change the human environment after restoration-related operations have concluded.

b. Irreversible or Irretrievable Commitments of Resources

Irreversible commitment of resources refers to a loss of non-renewable resources, such as mineral extraction, heritage (cultural) resources, or to those factors, which are renewable only over long time spans, such as soil productivity. Under the current condition, there would be no irreversible or irretrievable commitment of resources.

Irretrievable commitment applies to losses that are temporary, such as use of renewable natural resources. The production lost would be irretrievable, but the action would not be irreversible. Vegetation removed as commodity byproducts under the Proposed Action, is considered an irretrievable impact. Forest conditions would return, but it would take one or more decades for them to obtain the current conditions.

The vegetation that would be removed under the Proposed Action also has value as wildlife habitat, and/or human value for recreation or aesthetics, and would be irretrievably lost. However, this impact is in accordance with the management goals and objectives of restoration treatments.

c. Effects on Prime Farmland, Rangeland and Forestland

Prime forest land is not applicable to lands within the National Forest System. Under the Proposed Action, Forest system lands would be managed with coordination and sensitivity to the effects on adjacent lands. The UAWRP would enhance understory vegetation within range allotments for livestock and wildlife.

d. Effects upon Wetlands and Floodplains

No floodplains, associated with Executive Order 11988, exist within the Upper Applegate watershed. The Proposed Action would constitute a "no effect" undertaking in relation to the Wetlands Executive Order 11990 because no wetlands are involved. There would be no effects on floodplains associated with Executive Order 11988 as a result of implementing this restoration proposal, as none exist or would be affected.

The portion of the Proposed Action on lands administered by the Forest Service would be in compliance with Riparian Reserve standards and guidelines to allow attainment of the Northwest Forest Plan Aquatic Conservation Strategy. On lands administered by the BLM, treatments within Riparian Reserves would be consistent with the Southwestern Oregon Record of Decision and Resource Management Plan.

e. Adverse Environmental Effects Which Cannot Be Avoided

Implementation of the Proposed Action would cause no known unavoidable or other indirect adverse effects, other than the effects already stated.

f. Social/Economic Effects

The availability of natural resources contributes to the quality of life for many county residents. Many communities are closely tied to the forest in work and recreation. These communities are directly influenced by changes in the supply of resources produced from the forest, and by the forest production of firewood, game, scenic resources, and recreational opportunities. Implementation of the Proposed Action would cause no unavoidable or other indirect social/economic adverse effects, other than the effects already stated.

g. Energy Requirements

Under the Proposed Action, various amounts of fossil fuels, and human labor would be expended. Fossil fuel energy would not be retrievable: Neither are not in short supply and their use would not have an adverse effect upon continued availability of these resources.

h. Environmental Justice

Environmental Justice means that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner, by government programs and activities affecting human health or the environment.

One goal of Executive Order 12898 is to provide, to the greatest extent practicable, the opportunity for minority and low-income populations to participate in planning, analysis, and decision-making that affects their health or environment, including identification of program needs and designs. The Proposed Action, its Purpose and Need, and area of potential effect have been clearly defined. Scoping under the National Environmental Policy Act has utilized extensive and creative ways to communicate.

The Proposed Action does not have a disproportionately high and adverse human health effects, high or adverse environmental effects, substantial environmental hazard, or affects to differential patterns of consumption of natural resources. Extensive scoping did not reveal any issues or concerns associated with the principles of Environmental Justice. No mitigation measures to offset or ameliorate adverse affects to these populations have been identified. All interested and affected parties would continue to be informed throughout the decision making process.

There would be no discernable differences between the Proposed Action and the current condition regarding effects on Native Americans, women, other minorities, or the Civil Rights of any American Citizen.

i. Public and Worker Safety

There may be a concern for increased risk of accidental injury to members of the public who recreate in the Upper Applegate watershed during implementation activities. The application of mitigation measures designed for the protection of forest visitors would minimize this risk. Mitigation measures would include: restricted operations during specific industrial implementation actions; informing forest visitors of alternative use areas through signing; and partial or complete closure of some areas during implementation activities.

All project activities would comply with State and Federal Occupational Safety and Health (OSHA) codes.

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CHAPTER 4. CONSULTATION WITH OTHERS

Issues associated with these proposals were identified by an interdisciplinary team through an extensive scoping process. This process included a review and evaluation of all information gathered through specialist reconnaissance and field work and public involvement and scoping.

Table 4-1. List of Preparers

Interdisciplinary Planning Team	Resource Specialty
Brett Brown (FS)	Fire Ecologist
Dave Clayton, Bonnie Allison (FS)	Wildlife
Dave Bowden, Clint Emerson (FS)	Botany
Steve Brazier (FS)	Fisheries
Zach Rodriguez (FS)	Heritage
Joni Brazier (FS)	Soils
Jan Curtis-Tollestrup (FS)	Hydrology
Brian Long (FS)	Recreation
Rob Marshall (FS)	Fuels
Chamise Kramer (FS)	Public Involvement
Donna Mickley (FS)	District Ranger
Don Boucher (FS)	Writer-Editor/NEPA
Bill Schaupp (FS)	Insects and Disease
Kristi Mastrofini (BLM)	Resource Area Manager
Forest Gauna (BLM)	Botany
Greta Smith (FS)	Forest Planner
Jon Larson (BLM)	Fuels
Chad Vetter (BLM)	Silviculturist
Brian Lawatch (BLM)	Planner

Table 4-2. Consultation with Other Agencies and Offices

Name
National Oceanic and Atmospheric Administration (NOAA Fisheries)
Oregon State Department of Environmental Quality (DEQ)
United States Department of Interior Fish and Wildlife Service (USFWS)
Oregon State Historic Preservation Officer (SHPO)

The Forest Service formally contacted and invited consultation with the federally recognized tribes associated with the Rogue River-Siskiyou National Forest: Confederated Tribes of Siletz Indians of Oregon, the Confederated Tribes of the Grand Ronde Community of Oregon, the Coquille Tribe, the Cow Creek Band of the Umpqua Tribe of Indians, Elk Valley Rancheria, the Tolowa Dee-ni Nation, the Klamath Tribes, and the Quartz Valley Indian Reservation (Ft. Jones, CA).

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Appendix A

Iterative NEPA, Other Collaboratively Identified Projects, and Other Actions Considered but Eliminated from Further Analysis

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APPENDIX A

ITERATIVE NEPA AND OTHER COLLABORATIVELY IDENTIFIED PROJECTS AND OTHER ACTIONS CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

a. Introduction

In 2008 the U.S. Forest Service (USFS) and the U.S. Department of the Interior updated their existing National Environmental Policy Act (NEPA) procedures (36 CFR 220; 43 CFR 46) to permit a more open, transparent and collaborative approach to carrying out the NEPA mandate. Dubbed “iterative NEPA,” or iNEPA by practitioners, this approach reflects the incremental stages in which proposed actions are improved throughout the NEPA process by collaborating with community stakeholders in order to meet diverse interests. The use of the iNEPA process can therefore provide for a more effective and meaningful decision-making process.

This appendix discusses the iterations to the Proposed Action and the reason for the minor changes. It also lists other actions identified by the community and agencies that were not carried forward in the Proposed Action because they either did not require a NEPA decision or already had an existing decision that authorized implementation. Lastly, this appendix also discusses different strategies or methods suggested during the scoping period and the reason they were eliminated from further consideration in the Environmental Assessment (EA)

b. Iterative NEPA and Other Collaboratively Identified Projects

Whereas a traditional approach to NEPA would typically engage the public during distinct scoping periods at the beginning, and comment periods on the Environmental Assessment, with iNEPA, agencies are encouraged to adapt and modify proposals through a more flexible, incremental process of iteratively developing and improving proposed actions in response to what they learn during analysis and public involvement in the process. It is believed that this process can increase efficiency and limit polarization among constituents and communities. The process is designed to honor public involvement and collaboration throughout the NEPA process.

The following actions or strategies were submitted during the scoping process and were eliminated from consideration in the Proposed Action for the reasons stated.

The use of the iNEPA process is consistent with the objectives found in the Applegate Adaptive Management Area Guide which are to:

- * Improve the capacity for local public problem-solving across boundaries.
- * Gain understanding, cooperation, and mutual respect among the federal agencies, and between agencies and citizens.
- * Use resources efficiently.
- * Apply ecological principles.
- * Use adaptive management principles of testing, monitoring, and learning, and share this learning with all partners.
- * Share knowledge freely and effectively.

The iNEPA process was introduced to the community in April 2017 at a community workshop. The Forest Service and BLM continued to collaborate with community members leading up to the release of the Proposed Action in August 2017.

The scoping period, extended due to wildfires on the Siskiyou Mountains Ranger District, ended in November 2017. The scoping comments were reviewed and in March of 2018 a community workshop was held to discuss comments and evaluate the Proposed Action. This began the iterative process of fine-tuning the Proposed Action. As agency specialist began evaluating the Proposed Action, four more workshops were held, including a field visit, to discuss and suggest minor revisions of the Proposed Action.

The following table (Table A-1) display the iterations that took place from April 2017, with a discussion of why an activity was modified. Iteration 3 resulted in the Proposed Action described in detail in Chapter 2 of this document.

Table A-1. UAWRP Iterations

	Proposed Action Opportunity 4/20/2017	Reasons to not carry proposal forward to Proposed Action	Proposed Action 8/1/2017	Iteration 1 6/27/2018	Iteration 2 7/25/2018	Iteration 3 8/15/2018
Water and Aquatic Habitat	A1: Conduct a travel management analysis to identify problem areas and opportunities for decommissioning, closure or upgrade.	A detailed analysis was conducted to look at recommendations from an earlier analysis and carry forward proposals to include in this NEPA analysis.				
	A2: Consider re-introduction of beaver or beaver analogs where appropriate (Beaver Creek/Star Gulch are candidates).	Though this action is important and desired, to assess the potential, will require coordination with the Oregon Department of Fish and Wildlife. This project is not included in the current analysis.				
	A3: Restore or repair road impacts on BLM and FS roads:		A3: Restore or repair road impacts on BLM and FS roads:	Roads proposed on the BLM portion of the project area have been treated or will be treated under separate NEPA	Minor change from 6/27/18 proposal to clarify and provide more accurate estimates of mileage	Minor changes from 7/25/18 Iteration 2. More details regarding the amount and type of work
	A5: In over-stocked riparian areas, treat smaller diameter material to reduce the “wick” effect and promote larger trees. Would treat to enhance hardwood species as well as conifer species.	Treatments on BLM lands were dropped from proposal	A5: In over-stocked riparian areas, treat smaller diameter material to reduce the “wick” effect and promote larger trees. Would treat to enhance hardwood species as well as conifer species.	This treatment would take place in conjunction with other proposed treatments. Would not be a stand-alone treatment. Areas proposed for treatment under the proposed	Acres modified from 6/27/18 based on overlap with units that would be treated mechanically. Riparian areas proposed for treatment by prescribed fire alone were deferred. This	No change from 7/25/18 proposal

	Proposed Action Opportunity 4/20/2017	Reasons to not carry proposal forward to Proposed Action	Proposed Action 8/1/2017	Iteration 1 6/27/2018	Iteration 2 7/25/2018	Iteration 3 8/15/2018
				action would occur only on FS lands and are identified on the map	treatment is focused on overly dense saplings and poles as opposed to T-5 which is designed to improve structure in the stand	
	A6: Instream work to provide for habitat enhancement for native fishes and to restore hydrologic function, including dynamic channel processes.		A6: Instream work to provide for habitat enhancement for native fishes and to restore hydrologic function, including dynamic channel processes.	This action was dropped from the Proposed Action as it would be accomplished under another NEPA decision..	No change from 6/27/18 proposal.	No change from 6/27/18 proposal.
Terrestrial Biodiversity	<p>T-1: Augment native plant populations by out-planting at strategic sites.</p> <p>Reintroduce fire in key habitat areas within the landscape</p> <p>Native plant communities would also be enhanced through passive restoration.</p> <p>Passive restoration is the use of natural processes, sequences, and timing which occurs after the removal or reduction of adverse stresses without other specific remedial action</p>		<p>T-1: Augment native plant populations by out-planting at strategic sites.</p> <p>Reintroduce fire in key habitat areas within the landscape</p> <p>Native plant communities would also be enhanced through passive restoration.</p> <p>Passive restoration is the use of natural processes, sequences, and timing which occurs after the removal or reduction of adverse stresses</p>	<p>Proposed actions T-1 and T-8 were combined under a single activity: Botanical Restoration.</p> <p>Because the use of the term “passive restoration” was not clearly defined, the revised action is to monitor these areas and identify future restoration needs, if any</p>	Minor changes in the locations and acres of stands to be treated under this action were based on field reviews.	Minor changes in the locations and acres of stands to be treated under this action were based on field reviews. Clarifies where habitat improvement for <i>Fritillaria gentneri</i> would be focused with the identification of 3 Habitat Management Areas

	Proposed Action Opportunity 4/20/2017	Reasons to not carry proposal forward to Proposed Action	Proposed Action 8/1/2017	Iteration 1 6/27/2018	Iteration 2 7/25/2018	Iteration 3 8/15/2018
			without other specific remedial action			
	<p>T-2: Enhance pollinator habitat to focus on monarch butterfly habitat and other native pollinators by planting and seeding native pollinator plants. A low intensity prescribed burn in the Fall to burn grassy fine fuels would improve the site before seeding.</p> <p>Monitor native flowering plant and shrub responses to thinning and burning activities. Response with increased native flowering and nectar plants is desirable. Take steps to control and eradicate invasive plants. Identify opportunities to seed or plant natives in treated areas where appropriate.</p>		<p>T-2: Enhance pollinator habitat to focus on monarch butterfly habitat and other native pollinators by planting and seeding native pollinator plants. A low intensity prescribed burn in the Fall to burn grassy fine fuels would improve the site before seeding.</p> <p>Monitor native flowering plant and shrub responses to thinning and burning activities. Response with increased native flowering and nectar plants is desirable. Take steps to control and eradicate invasive plants. Identify opportunities to seed or plant natives in treated areas where appropriate.</p>	Current pollinator habitat work is already covered under a NEPA decision. Large-scale pollinator habitat improvement is now included in T-1	No change from 6/27/18 proposal.	No change from 7/25/18 proposal. Large area pollinator habitat improvement opportunities are included with T-1 .
	T-3: Mechanical thinning and prescribed fire would be used to promote the recovery of late-successional habitat and provide for resilience or the ability to recover. Resilience also refers to		T-3: Mechanical thinning and prescribed fire would be used to promote the recovery of late-successional habitat	Minor changes in the locations and acres of stands to be treated under this action were	Minor changes in the locations and acres of stands to be treated under this action were	Additional minor changes in the locations and acres of stands to be treated under this action were based

	Proposed Action Opportunity 4/20/2017	Reasons to not carry proposal forward to Proposed Action	Proposed Action 8/1/2017	Iteration 1 6/27/2018	Iteration 2 7/25/2018	Iteration 3 8/15/2018
	the capacity to return to a condition that provides structure and processes following disturbance.		and provide for resilience or the ability to recover. Resilience also refers to the capacity to return to a condition that provides structure and processes following disturbance.	based on field reviews	based on field reviews	on field reviews. Units where a commercial by-product would be realized have had logging systems and preliminary prescriptions identified.
	T-4: Treatment of existing known populations of noxious weeds		T-4: Treatment of existing known populations of noxious weeds	Treatment of existing noxious weed populations is covered under a current NEPA decision and is not carried forward as part of the Proposed Action.	No change from 6/27/18 proposal	No change from 7/25/18 proposal. This work is covered under current NEPA and is not carried forward in the Proposed Action.
	T-5: Mechanical thinning and prescribed fire in previously managed stands would enhance forest complexity and diversity in homogenous forests.		T-5: Mechanical thinning and prescribed fire in previously managed stands would enhance forest complexity and diversity in homogenous forests.	Minor changes in the locations and acres of stands to be treated under this action were based on field reviews	Minor changes in the locations and acres of stands to be treated under this action were based on field reviews	Minor changes in the locations and acres of stands to be treated under this action were based on field reviews. Units where a commercial by-product would be realized have had logging systems and preliminary prescriptions identified.
	T-6: Implement meadow and wetland restoration projects		T-6: Implement meadow and wetland restoration projects	This activity is not being carried forward under the	No change from 6/27/18 proposal	No change from 7/25/18 proposal. This activity is not

	Proposed Action Opportunity 4/20/2017	Reasons to not carry proposal forward to Proposed Action	Proposed Action 8/1/2017	Iteration 1 6/27/2018	Iteration 2 7/25/2018	Iteration 3 8/15/2018
	with an emphasis on the removal of encroaching conifers.		with an emphasis on the removal of encroaching conifers.	Proposed Action. Further field work is needed to identify specific areas. Some of these habitats overlap with the botanical areas referenced above in T-1		being carried forward under the Proposed Action. Further field work is needed to identify specific areas. Some of these habitats overlap with the botanical areas referenced above in T-1 .
	T-8: Enhance hardwood and oak and pine stands through the use of prescribed fire and thinning.		T-8: Enhance hardwood and oak and pine stands through the use of prescribed fire and thinning.	Proposed actions T-1 and T-8 were combined under a single activity: Botanical Restoration.	No change from 6/27/18 proposal.	No change from 7/25/18 proposal. Proposed actions T-1 and T-8 were combined under a single activity: Botanical Restoration.
Community and Culture	C-1: Maintenance thinning and fuels reduction would occur on approximately 2,500-3,000 acres previously treated under the Upper Applegate Road Hazardous Fuel Project (2008).		C-1: Maintenance thinning and fuels reduction would occur on approximately 2,500-3,000 acres previously treated under the Upper Applegate Road Hazardous Fuel Project (2008).	Specific work being carried out under the Decision Notice for the UAR Hazardous Fuels Reduction project is not carried forward under the Proposed Action	No change from 6/27/18 proposal.	No change from 6/27/18 proposal.
	C-2: Maintenance of fuels in previously treated areas using prescribed fire.		C-2: Maintenance of fuels in previously treated areas using prescribed fire.	In addition to the areas identified in the original Proposed Action, the UAR project area and the Burnt Peak Fire area were added	Minor changes in the locations and acres of stands to be treated under this action were based on field reviews.	Minor changes in the locations and acres of stands to be treated under this action were based on field reviews.

	Proposed Action Opportunity 4/20/2017	Reasons to not carry proposal forward to Proposed Action	Proposed Action 8/1/2017	Iteration 1 6/27/2018	Iteration 2 7/25/2018	Iteration 3 8/15/2018
				to provide for long-term maintenance of these areas.		
	C-3: Provide additional opportunities for non-motorized recreation by utilizing historic ditch locations or abandoned roads for trails minimizing adverse effects of new trail construction.		C-3: Provide additional opportunities for non-motorized recreation by utilizing historic ditch locations or abandoned roads for trails minimizing adverse effects of new trail construction.	No change from the original Proposed Action.	No change from 6/27/18 proposal.	No change from 7/25/18 proposal.
	C-4: Decommission unauthorized OHV trails and restore dispersed recreation use area.		C-4: Decommission unauthorized OHV trails and restore dispersed recreation use area.	Clarified that the Placer dispersed recreation site is part of this proposed activity.		Estimates have been updated. Field work was accomplished on the Jackson portion of the proposed action to better determine the extent of unauthorized trails.
	C-5: Identify special forest products gathering areas in collaboration with tribes and other user groups.		C-5: Identify special forest products gathering areas in collaboration with tribes and other user groups.	This does not require a NEPA decision at his time.	No change from 6/27/18 proposal.	No change from 7/25/18 proposal. This would involve ongoing discussions with Tribes and user groups.
	C-6: Restore/re-establish trail near McKee Bridge Picnic Area.		C-6: Restore/re-establish trail near McKee Bridge Picnic Area.	No change from the original Proposed Action.	No change from 6/27/18 proposal.	No change from 7/25/18 proposal.
	C-7: New single track motorized use trail construction/designation.		C-7: New single track motorized use trail construction/designation.	One segment from the original Proposed Action was dropped in	Changes to proposed action based on analysis by agency IDT	No change from 7/25/18 proposal. Analysis of

	Proposed Action Opportunity 4/20/2017	Reasons to not carry proposal forward to Proposed Action	Proposed Action 8/1/2017	Iteration 1 6/27/2018	Iteration 2 7/25/2018	Iteration 3 8/15/2018
				relation to concerns with sediment effects to anadromous fish in Beaver Creek and <i>Fritillaria gentneri</i> habitat. The route dropped from further consideration is the parallel route along FS Road 20.	resource specialists. Trail mapping refined by reviewing historic maps (1983). Proposed new construction to Boaz Mountain is deferred for further consultation with BLM. The proposed new construction near Squaw Mountain is deferred for further analysis and scoping in regard to re-opening FS Road 2010700 which has been decommissioned.	proposed routes continues.

c. Other Actions Considered But Eliminated From Further Analysis

The following actions or strategies were submitted during the scoping process and have been eliminated from further analysis for the reasons stated:

Use fire to accomplish restoration rather than rely on commercial fuel reduction.

Limiting treatments options limits the ability to achieve the purpose and need. Prescribed fire is one of the tools proposed for this project as are other tools. The selection of the appropriate tool for a given situation would be based on many factors.

No post-fire logging in the Burnt Peak Fire area.

Post-fire salvage logging is not proposed in the Burnt Peak Fire area. In areas where the Burnt Peak Fire burned at low severity, all options to achieve desired conditions will be considered based on the post-fire condition.

Focus commercial treatments only on areas adjacent to homes and previously managed plantations. Utilize Applegate Neighborhood Network thinning and fuel reduction prescriptions.

Areas adjacent to homes and private property were addressed with the Upper Applegate Road Hazardous Fuels Reduction Project and much of that work has been completed or is in progress. Limiting commercial treatments to only areas adjacent to homes and plantations does not fully address landscape resilience because it limits the ability to use all of the tools available to obtain desired conditions. The prescriptions developed by the Applegate Neighborhood Network will be considered during development of site-specific prescriptions.

Utilize a 21 inch diameter limit in all commercial units.

The use of a diameter limit (or age limit) discards elements such as the trees position in the canopy (e.g., a 24" diameter tree growing underneath a 30" diameter tree canopy), the health (e.g., diseased or suppressed), the trees location within the stand (e.g., growing within a Riparian Reserves versus on the top of a ridge), nor would it address conditions surrounding the tree (e.g., growing within a few feet of a tree of similar size but one of another species preferred for ecological reasons). On some growing sites, tree age is not a relevant factor, e.g., a small diameter tree may be very old and of poor vigor; inversely, a larger diameter tree may actually be young. Further, determining age on a tree-by-tree basis would be impractical.

For these reasons, the application of age or diameter limits would hamper attainment of the purpose and need. This consideration would not employ ecologically based prescriptions aimed at altering species composition and structure to reduce ladder fuels concurrent with promoting resilient forests. Overall (and arbitrary) diameter limitations are not a management strategy supported by the agencies.

Incorporate the Rogue Basin Cohesive Forest Restoration Strategy in planning and developing the project.

The Rogue Basin Cohesive Forest Restoration Strategy (RBS) is a strategy to prioritize landscapes across the Rogue River Basin and recommends treatments to achieve five objectives: mitigating local fire community risk; reducing large fire community risk through proportions of open forest; protecting existing and promoting future northern spotted owl habitat; and promoting fire resistance in climate resilient settings.

The objectives in the RBS are complementary to the purpose and need for action for the Upper Applegate Watershed Restoration Project, which protects community and agency identified values. The community developed Proposed Action was compared against the modeled outputs of the RBS. The overall area treated is similar but the types and amounts of treatment vary. This is primarily due to differences in applying a landscape model to a project-level analysis. The UAWRP Proposed Action and the RBS are both focused on increasing the pace and scale of treatments to affect change on a landscape scale.



(Photo US Forest Service)

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Appendix B

Mitigation Measures

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APPENDIX B

Mitigation Measures Upper Applegate Watershed Restoration Project

This Section discusses mitigation measures to constrain management actions that are applicable to the Proposed Action. Upon a final decision, selected measures would become a requirement and would be applied during implementation.

The Forest Service is required by the Council on Environmental Quality (CEQ) Regulations for implementing the procedural provisions of NEPA to identify all relevant, reasonable mitigation measures that could improve the project. Mitigation, as defined in the CEQ Regulations (40 CFR 1508.20) includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.
- Rectifying the impact by repairing, rehabilitating or restoring the affected environment.

Mitigation measures identified herein are specific to the implementation of actions considered within this Environmental Assessment. Standards and Guidelines and mitigation measures identified in the RRNF Land and Resource Management Plan as amended by the Northwest Forest Plan are also incorporated by reference as required measures.

The effectiveness and feasibility of the mitigation measures are assessed based upon the following rating system. These ratings are applied to all mitigation measures, except the Standard Operating Procedures identified below. Each measure will identify the code for effectiveness and feasibility at the end of the statement or paragraph. Ratings were determined by professional resource specialists based on current scientific research and/or professional experience or judgment

Table B-1. Effectiveness and Feasibility of Mitigation Measures

EFFECTIVENESS (E)

E1	Unknown or experimental; logic or practice estimated to be less than 75%; little or no experience in applying this measure.
E2	Practice is moderately effective (75 to 90%). Often done in this situation; usually reduces impacts; logic indicates practice is highly effective but there is minimal literature or research.
E3	Practice is highly effective (greater than 90%). Almost always reduces impacts, almost always done in this situation; literature and research can be applied.

FEASIBILITY (F)

F1	Unknown or experimental; little or no experience in applying this measure; less than 75% certainty for implementation. May be technically difficult or very costly. May be legally or socially difficult.
F2	Technically probable; greater than 75% certainty for implementation as planned; costs moderate to high in comparison to other options. Legally or socially acceptable with reservations.
F3	Almost certain to be implemented as planned; technically easy; costs low in comparison to other options. Legally or socially expected.

a. Standard Operating Procedures

A number of mitigation measures are basically standard operating procedures that would be employed by the Forest Service and those implementing authorized actions, pursuant to Federal and State regulations and Forest Service Manual direction. These procedures would apply to all aspects of fire hazard reduction activities.

- (1) Comply with all Terms and Conditions and standards for protection of Threatened, Endangered and Sensitive species, in compliance with the Endangered Species Act.
- (2) Comply with all requirements and standards of the Clean Water Act.
- (3) Comply with all requirements and standards of the Clean Air Act.
- (4) When vegetation management is involved with any action or project on National Forest lands, a site-specific silvicultural prescription for treatment will be developed and will be certified by a Forest Service Certified Silviculturist (R6 FSH 2409.17-2000-1, FSM 2478).
- (5) When prescribed fire is involved, a Burn Plan will be developed by a Fuels Specialist, following established regulations and policy, and approved by fire managers. This Burn Plan would guide the implementation based on site-specific conditions (including fuel moisture and weather conditions) at the time of planned ignition, and provide for pre- and post-burn evaluation to monitor the burn and its effectiveness at meeting resource objectives.
- (6) Provide for public safety at all times.
- (7) Concurrent with implementation, specific areas of concern will be reviewed and designed with input from qualified professional resource specialists.

b. Hydrology, Soils and Site Productivity

Best Management Practices (BMPs)

Mitigation Measures designed for the protection of soils, site productivity, and water quality are generally referred to as Best Management Practices (BMPs) as described in General Water Quality Best Management Practices, Pacific Northwest Region, November 1988 (USFS 1988), in concert with the National Core BMP Technical Guide (USFS 2012). While the terminology in the 1988 BMPs is dated (for example Streamside Management Unit now falls under Riparian Reserve), they are still considered effective under today's management direction. Per the National Core BMP Technical Guide, this analysis includes site specific BMPs that have been developed for the Upper Applegate project using national, regional, and forest guidance as well as local knowledge of the Upper Applegate watershed.

Specific BMPs determined to be applicable to hazardous fuel reduction actions include: **(E3, F3)**

TIMBER HARVEST (T)

- T-1 Timber Sale Planning Process
- T-2 Timber Harvest Design
- T-3 Use of Erosion Potential Assessment for Timber Harvest Unit Design
- T-4 Use of Sale Area Maps for Designating Water Quality Protection Needs
- T-5 Limiting the Operating Period of Timber Sale Activities
- T-7 Streamside Management Unit Designation
- T-8 Streamcourse Protection
- T-10 Log Landing Location
- T-11 Tractor Skid Trail Location and Design
- T-12 Suspended Log Yarding in Timber Harvesting
- T-13 Erosion Prevention and Control Measures During Timber Sale Operations
- T-14 Revegetation of Areas Disturbed by Harvest Activities
- T-15 Log Landing and Erosion Prevention and Control

- T-16 Erosion control on Skid Trails
- T-17 Meadow protection During Timber Harvesting
- T-18 Erosion Control Structure Maintenance.
- T-19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
- T-21 Servicing and Refueling Equipment

ROAD SYSTEMS (R)

- R-1 General Guidelines for the Location and Design of Roads
- R-2 Erosion Control Plan
- R-3 Timing of Construction Activities
- R-4 Road Slope Stabilization (Planning)
- R-5 Road Slope and Waste Area Stabilization (Preventive)
- R-9 Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects
- R-18 Maintenance of Roads
- R-19 Road Surface Treatment to Prevent Loss of Materials
- R-20 Traffic Control During Wet Periods
- R-23 Obliteration of Temporary Roads and Landings

FUELS MANAGEMENT (F)

- F1 Fire and Fuel Management Activities
- F-2 Consideration of Water Quality in Formulating Prescribed Fire Prescriptions
- F-3 Protection of Water Quality During Prescribed Fire Operations

WATERSHED MANAGEMENT (W)

- W-1 Watershed Restoration
- W-3 Protection of Wetlands
- W-4 Oil and Hazardous Substance Spill Contingency Plan and Spill Prevention Control and Countermeasures Plan
- W-5 Cumulative Watershed Effects
- W-6 Control of Activities under Special Use Permit
- W-7 Water Quality Monitoring
- W-8 Management by Closure to Use (Seasonal, Temporary, Permanent)
- W-9 Surface Erosion Control at Facility Sites

RECREATION (REC)

- REC-3 Management of Sanitation Facilities
- REC-4 Control of Refuse Disposal

VEGETATIVE MANIPULATION (VM)

- VM-1 Slope Limitations for Tractor Operation
- VM-2 Tractor Operation Excluded from Wetlands and Meadows
- VM-3 Revegetation of Surface Disturbed Areas
- VM-4 Soil Moisture Limitations for Tractor Operations

The following more specific mitigation measures are common to all Proposed Action to reduce surface erosion, sedimentation rates, and the risk for landslides, protect water quality, and maintain or enhance soils/site productivity.

Soils and Site Productivity

Soil and site productivity is maintained when soil compaction, displacement, puddling, burning, erosion, loss of site organic matter (soil and down woody material), and altered soil moisture regimes are kept within defined Standards and Guidelines. The direct detrimental effects on soils and site productivity occur when the indicators for these effects exceed Standards and Guidelines.

The indicators are contained in Forest Plan Standards and Guidelines. For this analysis, indicators are re-organized by compiling direction from the from the *1990 Rogue River National Forest Land and Resource Management Plan Standards and Guidelines* for soil quality and the *1998 Regional Supplement to the Forest Service Manual (FSM 2521 R-6 Supplement 2500-98-1, Effective August 24, 1998)*, dealing with soil resource and site productivity protection.

The mitigation measures as expressed by Standards and Guidelines for soil and site productivity are as follows:

(1) For areas with no prior soil disturbances, design projects such that detrimental soil conditions do not exceed more than 10 percent of an activity area (not including the permanent transportation system). **(E3, F3)**

(2) For areas where less than 20 percent of the site is in a detrimental soil condition from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 20 percent. **(E3, F3)**

(3) In areas where more than 20 percent of the site is a detrimental soil condition from prior activities, the cumulative detrimental effects from project implementation and restoration must, at a minimum, not exceed the conditions prior to the planned activity and shall move toward a net improvement in soil quality. **(E3, F3)**

(4) For activities to meet acceptable levels of soil loss and soil management objectives, the minimum-percent-effective ground cover (EGC) following cessation of any soil-disturbing activity for this project is **(E3, F3)**:

- 60% EGC on soils classed very slight, slight, low or moderate erosion hazard.
- 70% EGC on soils classed high or severe erosion hazard.
- 85% EGC on soils classed very high/very severe erosion hazard.

(5) The use of vehicles and equipment shall be limited to dry soil conditions to minimize compaction. Operating vehicles and harvest equipment on moist soils will cause compaction to be more severe and at greater depths in the soil. Percent moisture levels are to be determined by a Soil Scientist or trained Sale Administrator, using standard soils methodology (such as “Feel Method”), during project layout and implementation. Operations would be suspended when any soil caking, smearing, and/or rutting of approximately 4 to 6 inches begins to occur. **E3/F2**

(6) All cable yarding will be done with equipment capable of suspending a minimum of one end of the log; up to 150 foot lateral yarding required to skyline corridors (BMP T-12). An effective slash cover and/or water bars in cable corridors and skid trails will be installed following the completion of operations for erosion control (BMP T-16). **E3/F3**

Definitions for detrimental soil conditions:

Detrimental compaction is the increase in soil bulk density of 15 percent, or more, over the undisturbed level, a macro-pore space reduction of 50 percent or more, and/or a reduction below 15 percent macro porosity.

Detrimental puddling is the observable soil deformation and loss of soil structure when the depth of ruts or imprints is six inches or more. Soil bulk density usually increases with puddling.

Detrimental displacement is the removal of more than 50 percent of the A horizon, from a contiguous area greater than 100 square feet, which is at least 5 feet in width.

Detrimental Burned Soil is the condition where the mineral soil surface has been substantially changed in color, oxidized to a reddish color, and the next one-half inch blackened from organic matter charring by heat conducted through the top layer. The detrimentally burned soil standard applies to a contiguous area greater than 100 square feet, which is at least 5 feet in width.

Detrimental Surface Erosion is the 1) visual evidence of surface soil loss in areas greater than 100 feet through sheet, rill or gully erosion over a contiguous area greater than 100 square feet and 2) the reduction of an effective ground cover below a minimum-percent-acceptable level.

(7) During implementation, complete maintenance and erosion control on landings/roads/trails prior to the onset of extended periods of wet weather (BMP T-13, R-18). Restrict haul on roads during extended periods of wet weather. (BMP R-20). **E3/F3**

(8) During implementation, pre-existing (legacy) skid trails, temporary roads and landings shall be re-used to the extent practicable; so as to minimize additional ground impacts (detrimental soil conditions). (BMP T-11). **E3/F2**

(9) If operators are using feller-bunchers or cut-to-length harvesters off of designated skid trails:

- Allow mechanized equipment capable of creating and walking on slash (such as a cut-to-length system) to work off designated skid trails for one or two passes on at least eight inches of slash and under dry soil conditions (less than 25 percent soil moisture content).
- Allow mechanized equipment (feller-buncher systems) to work off designated skid trails during the dry season (soil moisture content less than 20 percent) for one or two passes only (one round-trip);
- Use low ground-pressure equipment off designated skid trails;
- Limit secondary trails to a minimum of 50-foot spacing off designated skid trails;
- Restrict all other use of ground-based equipment to designated skid trails; and
- If indications of detrimental soil disturbance are observed (e.g., surface erosion, soil displacement, loss of soil structure, platiness) off of designated skid trails, the activity shall be suspended until the soil strength is sufficient to resist detrimental compactive forces as determined by the Soil Scientist. **E3/F3**

(10) One or more of the following soil restoration methods shall be used (alone or in combination) to rehabilitate soil conditions on detrimentally disturbed ground (for example, on legacy or newly-designated skid trails, landings and temporary roads) where compaction tests or other monitoring identifies a need for a remedial or impact containment action. (BMP T-14, T-15, T-16, R-23) **E3/F2:**

- After completion of thinning activities, deep subsoiling of heavily compacted skid trails, landings and temporary roads may be employed, where soil conditions are feasible. This operation would use a specially-designed subsoiler implement, mounted on a -tracked excavator, to fracture and loosen compacted soil layers to re-establish water infiltration and deep root penetration. Mechanized equipment used for subsoiling would be restricted to the ground areas already disturbed to avoid creating additional ground impacts.
- After completion of thinning activities, scarification (ripping) of skid trails and other disturbed soil areas may be employed. This operation would use standard rock rippers or similar equipment, to superficially cultivate the surface of tractor skid trails as a way to promote natural herbaceous re-vegetation by providing seed catchments and shallow water infiltration.
- During subsoiling or scarification, 5 to 10 tons per acre of woody material and/or slash may be placed on top of disturbed ground areas, either manually or with a machine. Dispersing organic material evenly across tractor skid trails, landings, and other bare soil areas reduces erosion and increases water infiltration.
- Following completion of ground disturbing operations, and in situations where rapid (within months) protection of bared soils is necessary, mulching, grass seeding, shrub planting or tree planting may be conducted using native, non-invasive (and weed-free) grass seed or local native plants (as recommended by a botanist). Optionally, or in combination, sediment capture devices, such as rice straw wattles or bales, may be used to control erosion and reduce sediment movement.
- Selection and use of these actions would be based on the existing condition of the site following completion of ground disturbing operations. These actions do not result in instant restoration; rather they begin the process of restoration. **E3/F2**

(11) All re-constructed or newly-constructed temporary roads would be reclaimed as soon as practical by the contractor before the storm season, unless mitigated with prescriptions provided on a case-by-case basis from a soils/geology/hydrology specialist. **E3/F2**

(12) Reclamation of temporary roads may include one or more of the following actions: removal of temporarily installed culverts, excavating cross ditches (water bars) to drain water captured by the former running surface, placing large logs or rocks onto the running surface to deter vehicle use, or re-contouring the road template to near-natural ground conditions, as well as any of the soil restoration methods discussed above. (BMP R-23). **E3/F2**

(13) Plan pile burning and prescribed fire operations for when litter, duff, and soil moistures are high enough to minimize consumption of soil organic matter and minimize soil heating. Minimize the size of individual slash and pile piles scattered in the units to less than 10 ft. by 10 ft. Distribute piles to reduce severe burn impacts from concentrated fuel. (BMP F-2, F-3). **E3/F2**

(14) During prescribed fire operations, minimize erosion off of constructed firelines by implementing erosion control measures before extended periods of wet weather, and rehabilitating the fire line after the completion of operations. (BMP F-3). **E3/F2**

c. Down Wood

As with snags, down logs are important for wildlife and aquatic ecosystem function. Consistent with retention goals for snags, down coarse wood will be retained to support forest function.

(1) In general, the Proposed Action will maintain down woody material within the upper one third of the range for that plant association group (PAG), with more down wood retained in riparian areas and on northerly aspects than on southerly slopes. Where standing green trees are felled to meet habitat objectives, felled trees will be left in place as needed to meet down wood and/or soil objectives. **(E3, F3)**

c. Geology

(1) Reduce risk to landslide and surface erosion hazards as much as possible by locating any ground disturbing activity away from unstable terrain and/or wetland areas. **(E3, F3)**

(2) Slope stability and erosion mitigation measures are needed to prevent landslides and soil erosion from occurring at freshly disturbed sites. This could include utilizing geotextile fabric with rock blanketing to armor exposed slopes to prevent surface water from transporting soils off site and/or concentrating flows into unstable locations. Erosion control blankets combined with vegetation plantings are also an effective method to use to stabilize disturbed soils on steep or moderately steep slopes. **(E3, F3)**

(3) Restrict roadway use during wet weather conditions for the portions of the Upper Applegate watershed that contain sandy soils. These areas are extremely erosive during wet weather conditions and may cause road and other resource damages. If haul occurs during wet weather conditions, roads should be surfaced with crushed aggregate from weed-free rock sources. **(E3, F3)**

(4) Temporary road construction and reconstruction should be accomplished by October 31, or if conditions are still dry, roadwork will be finished prior to the onset of wet weather season as determined by an agency hydrologist, geologist, fisheries biologist, or soils scientist. **(E3, F3)**

(5) After a precipitation event or at the beginning of operations following the wet season, it will be necessary to determine when conditions are dry enough for activities to resume. In general, if the roadway or work area can support vehicles without causing rutting, soil displacement, damage to drainage structures, and with no sediment delivery to streams, it can be used. **(E3, F3)**

d. Fuels and Air Quality

- (1) Contractual fire protection requirements will be enforced. **(E3, F3)**
- (2) Implement prescribed burning during periods when the atmospheric conditions will transport smoke in a southerly direction away from the Rogue Valley. **(E3, F3)**
- (3) Apply erosion control measures (native grass seeding, lop and scatter wood, etc.) to areas of exposed mineral soil in excess of 100 square feet that may result from prescribed fire. **(E3, F3)**
- (4) Minimize fireline construction utilizing changes in aspect or wet line to the extent that is operationally feasible. Firelines will be constructed as close to the date as possible that underburning would occur to minimize weathering and erosion. Litter-duff will be raked back into the fireline after the prescribed underburn is declared out. **(E3, F3)**

e. Botanical Resources

The following specific mitigation measures are prescribed for protection of botanical resources:

- (1) *Fritillaria gentneri* populations should be buffered from project activities. Overhead canopy should be maintained within a 50 foot radius of the plants. A 50 foot radius no-activity buffer would be made around known individual plants. **(E3, F3)**
- (2) Not much is known about fire effects for; *Cryptantha milo-bakeri*, *Delphinium nudicaule*, *Keckiella lemmonii*, *Rhamnus ilicifolia*, and *Solanum parishii*. For all of these species it is assumed that they existed with low intensity fires during their dormant period. These species are found in more open habitats, it is recommended that these sites be buffered from project activities with a 25 foot radius buffer. Vegetation may be cut within these buffers but no pile burning should occur within them. **(E3, F3)**
- (3) *Cypripedium fasciculatum* populations should be buffered from project activities. Overhead canopy should be maintained within a 50 foot radius of the plants. Within the 50 foot buffer, a 10 foot radius no-activity buffer may be made around the plants to allow smaller material (conifers/brush) to be cut (within the 50 foot buffer but outside the 10 foot buffer) and removed outside the 50 foot buffer for piling and burning. If work is done between the 50 foot and 10 foot buffers, a botanist (or knowledgeable person assigned by the botanist) should be on site at the time of implementation. **(E3, F3)**
- (4) Forest Service botanist will flag for avoidance appropriate populations of federally Threatened and Endangered and Forest Service Sensitive species. Yellow and black striped flagging will be used to delineate population boundaries. Some specific areas may require a limited operating period (LOP) to minimize impacts to plants. **(E3, F3)**
- (5) Populations protected under Survey and Manage guidelines will be flagged for avoidance. Yellow and black striped flagging will be used to delineate population boundaries. **(E3, F3)**
- (6) Hazard trees adjacent to flagged populations of Threatened and Endangered, Survey and Manage, and Forest Service Sensitive special interest species will be directionally felled away from the flagged area to avoid disturbing the population. Directionally felled trees may only be removed if it causes no ground disturbance within the flagged area. Yellow and black striped flagging will be used to delineate population boundaries. **(E3, F3)**
- (7) Hazard trees located within the flagged population boundary for TES, Survey and Manage, or special interest species may be felled, but must be left on-site to avoid ground disturbance. Yellow and black striped flagging will be used to delineate population boundaries. **(E3, F3)**

- (8) Meadows will not be used for landings or staging areas. **(E3, F3)**
- (9) No canopy- or ground-disturbing activity may occur in areas flagged for avoidance with yellow and black botany flagging unless otherwise allowed in consultation with a Forest botanist. **(E3, F3)**
- (10) In areas with known populations of TES or Survey and manage fire behavior will be minimized through use of a backing-fire or other appropriate methods. Do not ignite prescribed fire within identified boundaries of avoidance areas for sensitive plant species. **(E3, F3)**
- (11) If additional Forest Service Sensitive plant species not currently known or covered by these mitigation measures are found, mitigation measures will be developed to ensure the viability of those species in the National Forest portion of the Upper Applegate watershed. **(E3, F3)**
- (12) Any straw or seed placed within the project area must be documented as Oregon certified weed free. Other materials, where State inspection protocol does not exist (gravel, wood chips), used as mulch in the project area should be inspected by a Forest representative to determine the potential for spread of noxious weeds. **(E3, F3)**

f. Invasive Non-native Plants

This Environmental Assessment and these mitigation measures also incorporate by reference the Standards and Guidelines added to the RRNF LRMP by the Regional Forester's October 2005 Record Of Decision for Preventing and Managing Invasive Plants.

- (1) Limit activities at sites with known infestations of Oregon Dept. of Agriculture A, B, and T-listed noxious weed species (excluding bull thistle and Klamath weed). Treat known occurrences in accordance with the RRNF Weed Management Plan **before** project implementation, if activities must occur in these areas. Continue annual treatments as long as activities continue in these areas. Forest Service botanist will flag for avoidance populations of moderate and high priority non-native invasive species. Orange and black flagging labeled with "INVASIVE SPECIES" will be used to delineate population boundaries. **(E3, F3)**
- (2) Project managers will notify a Forest botanist in advance of project implementation in order to allow enough time for all non-native invasive plant populations to be flagged. All populations within the implementation area as well as along routes used to access the area will be flagged prior to implementation. **(E3, F3)**
- (3) Unless necessary for safety, equipment, vehicles, and personnel will avoid working within flagged noxious weed sites. If operations cannot avoid working within flagged invasive plant populations, a Forest Service botanist will be consulted to develop methods to prevent or minimize the risk of spread. Methods may include blading infested soil away from activity zone and covering this soil or adding a barrier to the landing so seed banks cannot be transported. **(E3, F3)**
- (4) Logging, road-building, and heavy equipment and machinery will be cleaned of dirt, mud, and plant parts before arriving at the Upper Applegate watershed. If working in a portion of the Upper Applegate watershed infested with Oregon Dept. of Agriculture A, B, and T-listed noxious weed species (excluding bull thistle and Klamath weed), wash and/or clean equipment and machinery on-site before moving or leaving the area. **(E3, F3)**
- (5) Use the cleanest rock source possible, if aggregate is needed. If possible, do not grade or disturb road shoulders in the vicinity of noxious weed occurrences. If soil disturbance (grading, road reconstruction, road maintenance etc.) must occur, do so after infestations have been treated. If grading must occur, grade into an infestation, not away. **(E3, F3)**

(6) Any areas authorized for restoration treatments will be surveyed for noxious weeds and other invasive non-native plants during the second summer after activity occurs. **(E3, F3)**

(7) Under the terms of the RRNF Weed Management Plan and any authorized contracts, workers are required to help prevent new infestations, limit the expansion of existing populations, and report new sites. **(E3, F2)**

(8) Any straw or seed placed within the project area must be documented as Oregon certified weed free. Other materials, where State inspection protocol does not exist (gravel, wood chips), used as mulch in the project area should be inspected by a Forest representative to determine the potential for spread of noxious weeds. **(E3, F2)**

g. Terrestrial Wildlife Species and Habitat

Mitigation Measures to protect northern spotted owl pair activity centers (PACs):

The Forest retains discretion to halt and modify all projects, anywhere in the process, should new information regarding proposed or listed Threatened or Endangered species arise. Minimization of impacts will then, at the least, include an appropriate seasonal restriction; and could include clumping of retention trees around the nest trees, establishment of buffers, dropping the unit(s)/portions, or dropping the entire project.

The seasonal or daily restrictions listed below may be waived at the discretion of the Line Officer if necessary to protect public safety (as in the case of emergency road repairs or hazard tree removal). Emergency consultation with the USFWS will then be initiated in such cases, where appropriate.

Any of the following Mandatory Project Design Criteria (PDC) may be waived in a particular year if nesting or reproductive success surveys conducted according to the USFWS endorsed survey guidelines reveal that spotted owls are non-nesting or that no young are present that year. Waivers are only valid until March 1 of the following year. Previously known sites/ activity centers are assumed occupied until protocol surveys indicate otherwise.

(1) Activities (such as tree felling, yarding, road construction, hauling on roads not generally used by the public, prescribed fire, muffled blasting) that produce loud noises above ambient levels will not occur within specified distances (Table B-2) of any documented owl activity center between March 1 and June 30 (or until two weeks after the fledging period) – unless protocol surveys have determined the activity center to be not occupied, non-nesting, or failed in their nesting attempt. The distances may be shortened if substantial topographical breaks or blast blankets (or other devices) muffle sound traveling between the work location and nest sites. **(E3, F3)**

The Forest Service has the option to extend the restricted season until September 30, based on site-specific knowledge (such as a late or recycle nesting attempt) if project activities would cause a nesting spotted owl to flush (See disturbance distance).

Table B-2. Northern Spotted Owl Restrictions

Type of Activity	Zone of Restricted Operation
Heavy Equipment (including non-blasting quarry operations)	105 feet
Chain saws	195 feet
Impact pile driver, jackhammer, rock drill	195 feet
Small helicopter or plane	360 feet*
Type 1 or Type 2 helicopter	0.25 mile*
Blasting; 2 lbs. of explosive or less	360 feet
Blasting; more than 2 lbs. of explosives	1 mile

* - If below 1,500 feet above ground level

(2) In the event new spotted owl pair activity centers are found adjacent to or within the Upper Applegate watershed, mitigation to prevent disturbance will be designed in accordance with the Project Design Criteria (PDCs) listed in the Biological Assessment (and Opinion) (USDA Forest Service 2008). **(E3, F3)**

Fuels Management, Prescribed Fire

Firefighter safety must be taken into account at all times when using mitigation measures. If implementation of PDCs might cause human safety risks, the Forest Service will respond to the human safety threat and will determine if that response is grounds for re-consultation.

(1) Burning will not take place within 0.25 miles of spotted owl sites between March 1 and June 30 (or until two weeks after the fledging period) unless substantial smoke will not drift into the nest stand. No fuels treatment activities will take place within 200 meters of the activity center. **(E3, F3)**

Mitigation Measures to protect bald eagles:

(1) No known bald eagle nest trees, perch trees, or roost trees will be cut, or modified to preclude function on NFSL. This includes habitat at alternate nest sites. Eagles forage from these sites. Perch trees along shorelines are especially important. The intent is to protect those potential perches that “stand out.” **(E3, F3)**

(2) Work or other activities above ambient noise levels that cause disturbance, including helicopter use, logging, and construction will not take place within 0.25 mile (approximately 400 m) of *active* nests/roosts (not line of site) or within 0.5 mile (approximately 800 m) (line-of-sight) from nests/roosts during periods of eagle use, unless surveys demonstrate that the nest or roost is not being used.

Critical nesting periods generally fall between 1 January and 31 August. Active winter roosts need protection from disturbance from approximately 15 November to 15 March. Work restriction windows may be modified, based on site-specific recommendations by local biologists. **(E3, F3)**

Mitigation measures to minimize effects to the Siskiyou Mountains Salamander:

Follow all mitigation measures outlined in the Siskiyou Mountain Salamander Conservation Strategy (2007) (https://www.fws.gov/yreka/FR-Docs/SMSalamander/SMS_Conservation_Strategy_2007_and_Appendices.pdf).

The strategy include specific treatments within High Priority sites, including seasonal operating periods to reduce direct mortality, limitations on canopy cover reduction, limits on soil disturbance, the Strategy also describes recommendations for all suitable salamander habitats within the Upper Applegate watershed. **(E3, F3)**

Mitigation Measure to minimize effects to goshawks:

(1) If a goshawk nest site is detected within the Upper Applegate watershed, a Wildlife Biologist will determine nesting status (presence or absence of young). If young are determined to be present, activities will be restricted within 0.25 mile of the nest site until August 31 or until a Wildlife Biologist determines young to be successfully fledged from the nest. **(E3, F3)**

Mitigation Measure to minimize effects to great gray owls:

(1) If a great gray owl nest is discovered during project implementation activities, protect nest site with a 0.25 mile no activity buffer around the nest site and a 300 foot no activity buffer around natural meadows and openings. **(E3, F3)**

Mitigation Measures to minimize effects to Pacific fisher:

(1) Retain a minimum of one 0.5 to 1 acre untreated patch per 40 acre block of the largest diameter trees, snags, and CWM where overstory canopy closure is $\geq 70\%$. These patches are designed to provide suitable den and rest sites for Pacific fisher throughout all treatment areas. In addition, where there is suitable den sites in mixed conifer/hardwood (black oak) on ridges with south east to south west aspects, restrict burning and cutting activities from March 15 through June 1. **(E1, F2)**

(2) Thinning of unmanaged stands and prescribed fire within suitable denning habitat will be restricted to outside of the denning season, March 1 to June 1. **(E2, F2)**

Mitigation Measures to minimize effects to bats:

Abandoned mines pose hazards to people using public lands. Abandoned mine hazards include falling into open shafts, trenches, or pits; radiation; falling rocks; rodent droppings with Hanta virus; and suffocation. In addition, as bats in the Upper Applegate watershed are known to use large snags minimize the felling of those snags that extend above the primary canopy during the breeding season – June 15 to August 30. **(E2, F3)**

Mitigation Measures for Mollusks

Any sites that are located for either sensitive or Survey and Manage mollusks will have no treatments buffers applied. **(E3, F3)**

General Wildlife Mitigation Measure – Pile Burning:

(1) Slash piles provide habitat for multiple species of wildlife. Mollusks, salamanders, and small mammals use these piles as refugia where surface and activity fuels have been treated. Pacific fisher forage in these piles for prey. Leave 3-5 unburned piles/acre for wildlife where they do not serve as ladder fuels or create an unacceptable risk (i.e., adjacent to roads, within riparian reserves, or legacy trees). **(E3, F2)**

h. Aquatic Species and Habitat

(1) Refuel power equipment, or use absorbent pads for immobile equipment, at least 150 feet distant from water bodies, to prevent direct delivery of contaminants into a water body. **(E3, F3)**

(2) Avoid application of dust abatement materials (for example, lignon or Mag-Chloride) within 25-feet of a water body or stream channel during or just before wet weather, and at stream crossings or other locations that could result in direct delivery to adjacent water bodies. Procurement of water used in dust abatement activities from pump chances will follow the Project Design Criteria for Pump Chance Use programmatic category (NOAA Fisheries 2001). **(E3, F3)**

(3) Prescribed burning within Riparian Reserves to achieve fuel reduction and wildlife habitat objectives will occur with the following restrictions: **(E3, F3)**

- Hand piles closer than 25' of a stream will not be burned.
- No direct ignition will be done within 50' of a stream, and underburning initiated outside of the 50' buffer will be allowed to back into this buffer as long as the underburn is of low intensity and the midlevel and upper canopies are not at risk.

(4) The burn plan for treatments adjacent to perennial streams will include the objectives of retaining an unburned strip of duff next to the stream averaging between 25-50 feet wide, as well as retention of coarse woody material within 50 feet. These objectives will be met through means such as igniting well outside 50 feet, watering down or removing fuels around at-risk coarse woody material, constructing handlines, etc. **(E3, F3)**

i. Cultural Resources

(1) Notify Forest Archaeologist of any heritage resources discovered during project implementation. If a cultural resource is found, cease construction activities at that location until site evaluation and determination of effect have been completed. **(E3, F3)**

(2) Maintain strict confidentiality of the location of any identified heritage sites within the Upper Applegate watershed by designating them as “avoidance areas.” **(E2, F3)**

(3) During activity fuels work, avoid creating piles of slash on or adjacent to bear grass plants. **(E3, F3)**

j. Recreation and Public Safety

(1) Commercial tree removal and hauling operations will only be allowed between 7:00 am and 7:00 pm and will not be allowed on weekends or holidays. **(E3, F3)**

(2) Utilize partial area closures during commercial tree removal and underburning operations to minimize the potential for accidental injury to recreationists during operations. Utilize signing, press releases, and recreation opportunity guides to redirect recreation activities to safe use areas during project operations (recreation). Operations will require project warning signs. **(E3, F3)**

(3) All project activities (Forest Service and contract) will comply with State and Federal Occupational Safety and Health (OSHA) codes. All Forest Service project operations will be guided by FS Handbook 6709.11 (Health and Safety Code Handbook). **(E3, F3)**

(4) Consider restrictions or close areas to hunting where contractors or Forest Service personnel are working. **(E3, F3)**

(5) Prior to implementation, develop a safety plan(s) relative to public access. **(E3, F3)**

(6) A number of mitigation measures will be implemented to reduce the effects of implementation on recreation users. These will include advanced notice of closures, signing at appropriate locations, alternate route suggestions, and notification of various user groups. **(E3, F3)**

(7) Mitigation measures to reduce this effect include increased patrol by law enforcement personnel and trained volunteers, continued cooperation with user groups to educate the public, and signing placed at strategic locations. Due to funding shortages, increased patrol by FS law enforcement officers may not be possible. **(E3, F3)**

(9) To the greatest extent possible, continue to authorize long established special use recreation events at their traditional locations. This will require close coordination between FS recreation and contracting officer representatives in concert with permit holders. Provide legible maps to the public that clearly show area closures and/or areas of project activities. **(E3, F2)**

(10) Immediately re-establish authorized trails in areas where project activities have blocked or otherwise impeded traditional trail use by recreationists. Examples include reestablishment of trail tread and clearing of fuels on the trail. **(E3, F3)**

(11) Identify recreation improvements (trails, trailheads, signs) on contract area maps and protect, repair and restore any damage caused by project operations. **(E3, F3)**

